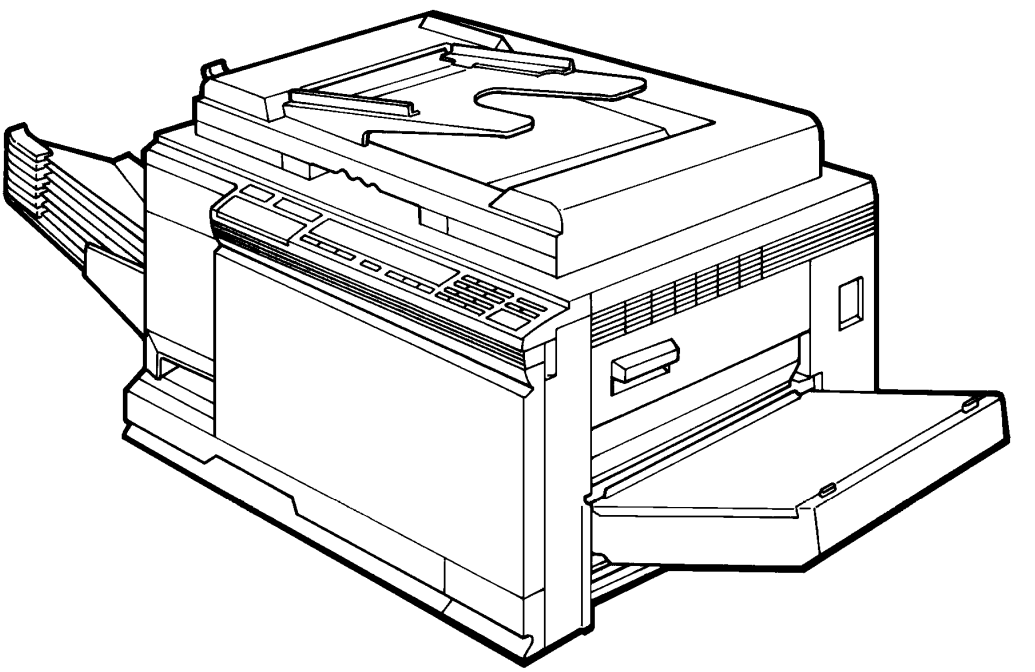
RICOH

RICOH FT4418

RICOH FT4421

SERVICE MANUAL



RICOH COMPANY, LTD.

SECTION 1

OVERALL MACHINE INFORMATION

1. SPECIFICATIONS

Configuration:	Desk top
Copy Process:	Dry electrostatic transfer system
Originals:	Sheet/Book
Original Size:	Maximum A3/11"x17"
Copy Paper Size:	Maximum A3/11"x17" Minimum A6/5 1/2" x 8 1/2" (lengthwise)
(Duplex Copying)	A4 and B5/8 1/2" x 11" (sideways)
Copy Paper Weight:	Cassette feed: 52 to 157 g/m^2 (14 to 42 lb) Paper tray feed: 64 to 90 g/m^2 (17 to 22 lb) Manual feed: 52 to 157 g/m^2 (14 to 42 lb) Duplex: 59 to 104 g/m^2 (16 to 27 lb)
Reproduction Ratio:	2 Enlargement and 3 Reduction

	A4/A3 Version	LT/LDG Version
Enlargement	141% 122%	155% 129%
Full size	100%	100%
Reduction	93% 82% 71%	93% 74% 65%

Zoom:	From 50% to 200% in 1% steps
Copying Speed:	18 copies/minute (A4/8 1/2" x 11" sideways) 10 copies/minute (A3/11" x 17")
Warm-Up Time:	60 seconds (at 20°C)
First Copy Time:	5.9 seconds (A4/8 1/2" x 11" sideways)
Copy Number Input:	Ten keys, 1 to 99 (count up)
Manual Image Density Selection:	7 steps

Automatic Reset: 1 minute standard setting; can also be set to 3 minutes or no auto reset.

Paper Capacity:
Cassettes: 500 sheets
Paper tray: 250 sheets
Manual feed table: 50 sheets

Toner Replenishment:
Black: Cartridge exchange (370g/cartridge)
Color (red, blue, & green): Cartridge exchange (310g/cartridge)

Copy Tray Capacity:
250 sheets (B4/8 1/2" x 14" and smaller)
100 sheets (A3/11" x 17")

Power Source:
110V/ 60Hz/ 15A (for Taiwan)
115V/ 60Hz/ 15A (for N.A.)
220V/ 50Hz/ 8A (for EU.)
220V/ 60Hz/ 8A (for EU.)
240V/ 50Hz/ 8A (for EU.)

(Refer to the serial number plate (rating plate) to determine the power source required by the machine.)

Power Consumption:
Maximum: 1.2 kw
Warm-up: 0.72 kw (average)
Ready: 0.16 kw (average)
Copy cycle: 0.81 kw (average)

Dimensions:

	Width	Depth	Height
Copier only	672 mm (26.5")	600 mm (23.7")	410 mm (16.2")
Full system	1149 mm (45.3")	600 mm (23.7")	513 mm (20.2")

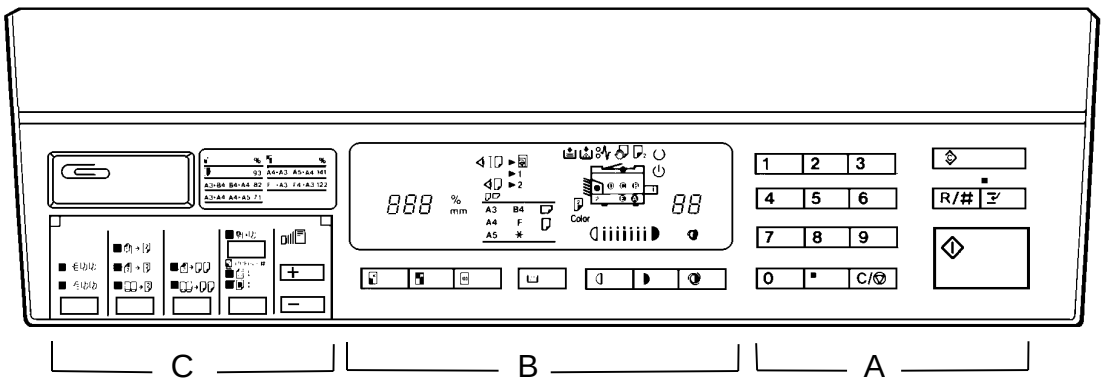
Weight:
Copier only: 52 kg (114.7 lb)
Full system: 71 kg (156.6 lb)

Optional Equipment:
Document feeder
10 bin sorter
Duplex unit
Color development unit
Key counter
Universal Cassette

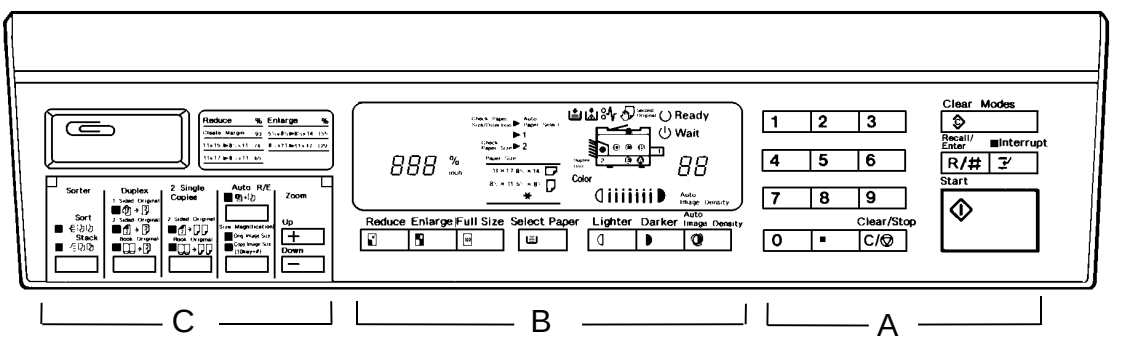
•Specifications are Subject to change without notice.

2. OPERATION PANEL

— A4/A3 Version —



— LT/LDG Version —



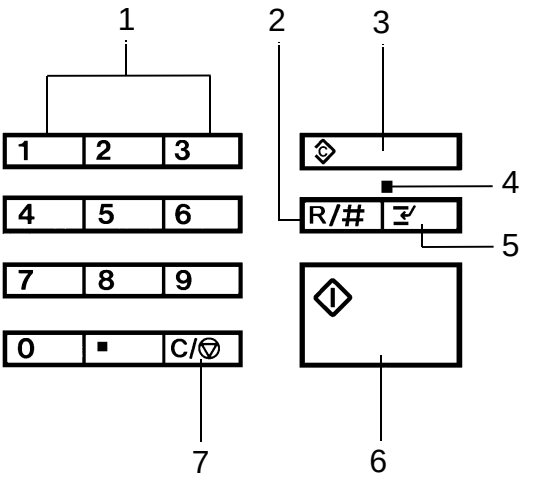
Section A: See page 1-4.

Section B: See page 1-5 or 1-6.

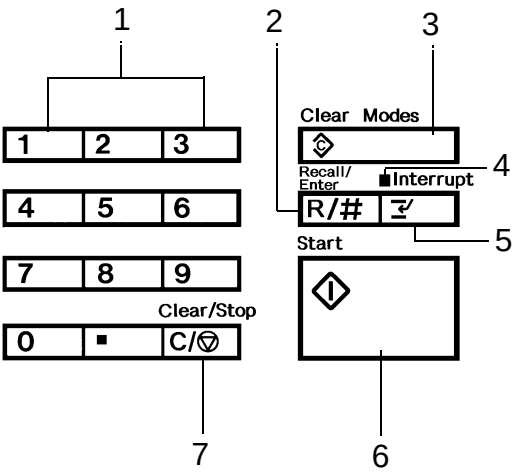
Section C: See page 1-7 or 1-8.

Section A —

— A4/A3 Version —



— LT/LDG Version —



1. Number Keys
The number keys are used to enter the desired number of copies. They are also used to input the sizes of the original and the copy image when in size magnification mode.

2. Recall/Enter Key
Press to display the number of copies entered. Also use to enter or change data when in size magnification mode.

3. Clear Modes Key
Press to clear all previously entered settings and modes.

4. Interrupt Indicator
Lights when interrupt mode is selected.

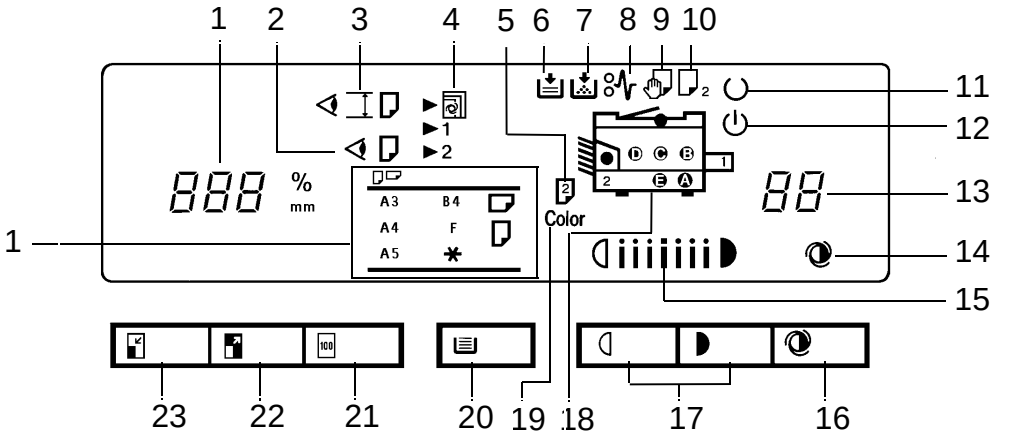
5. Interrupt Key
Press to make interrupt copies during a copy run.

6. Start Key
Press to start copying.

7. Clear/Stop Key
Press to cancel the copy number entered. While copying, press to stop copying.

— Section B —

— A4/A3 Version —



1. Magnification Ratio Indicator
Shows the selected reproduction ratio and data for the Size Magnification mode.

2. Check Paper Size Indicator
Lights when improper paper size is selected in the book original mode or the duplex mode. (Copying is impossible.)

3. Check Paper Size/Direction Indicator
Blinks when the original size does not match with the paper size or direction. This indicator is functional only with the document feeder. (Copying is possible.)

4. Auto Paper Select Indicator
Lights when auto paper select mode is selected. This mode is an optional feature with the document feeder.

5. Duplex Unit Indicator
Lights when the duplex unit is installed.

6. Load Paper Indicator
Lights when the cassette or the paper tray in use runs out of paper.

7. Add Toner Indicator
Blinks when it is time to change the toner cartridge. When it is continuously lit, the copier cannot be used until a new cartridge is installed.

8. Check Paper Path Indicator
Lights if there is a misfeed within the machine.

9. Manual Feed Indicator
Lights when the manual feed table is open.

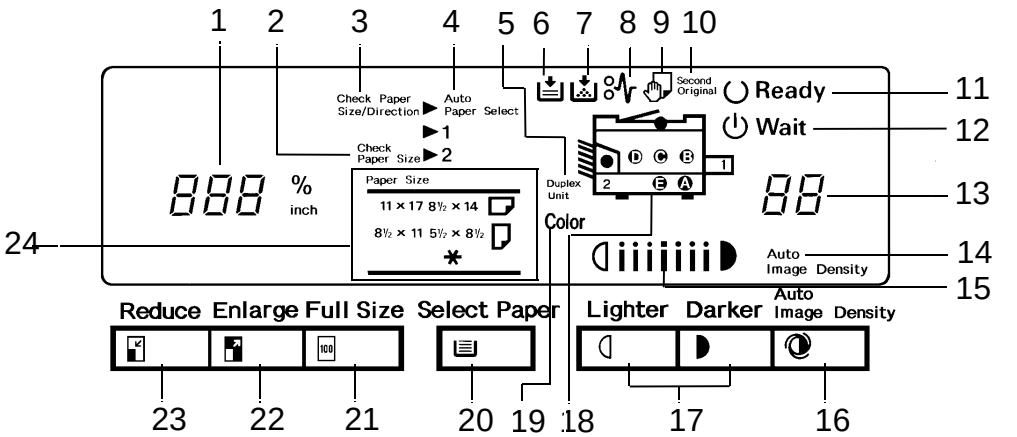
10. Second Original Indicator
Lights when it is time to position the second original on the exposure glass when making duplex copies.

— Light ON —
If copying has been completed, press duplex key to cancel the duplex mode and press start key to eject copies.

— Light Blinking —
Press start key to eject copies.

11. Ready Indicator
Lights when the machine is ready to make copies.

— LT/LDG Version —



12. Wait Indicator
Lights when that the machine is not ready to copy.

13. Copy Counter
Displays the number of copies entered. While copying, it shows the number of copies made.

14. Auto Image Density Indicator
Lights when the copier is automatically controlling image density. If this indicator blinks, refer to page 55.

15. Manual Image Density Indicator
Shows the manually selected image density. If this indicator blinks, refer to page 55.

16. Auto Image Density Key
Press to select/cancel the automatic image density mode.

17. Manual Image Density Keys
Use to cancel the automatic image density mode and manually select the image density level.

18. Misfeed Location Display
Shows the location(s) of misfed paper.

19. Color Copy Indicator
Lights if a color toner development unit is installed.

20. Select Paper Key
Press to select the cassette or the paper tray for paper feed, or press to cancel auto paper selection mode when the document feeder is installed.

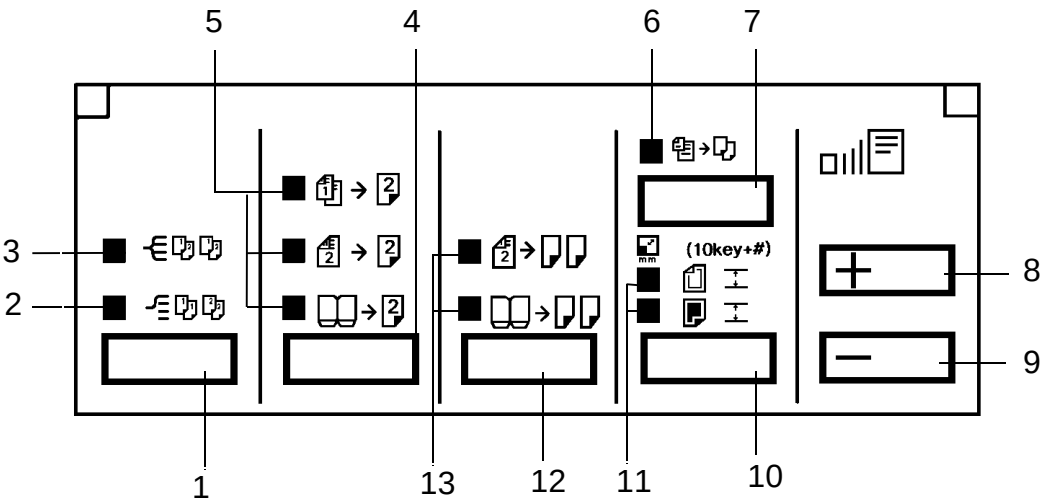
21. Full Size Key
Press to make copies the same size as the originals.

22. Enlarge Key
Press to make enlarged copies.

23. Reduce Key
Press to make reduced copies.

24. Paper Size Indicator
Shows the size and direction of the paper in use.

— Section C —
— A4/A3 Version —



1. Sorter Key
Press to select the sort or stack mode. The sort mode and stack mode are optional features requiring a sorter.

2. Stack Indicator
Lights when in the stack mode.

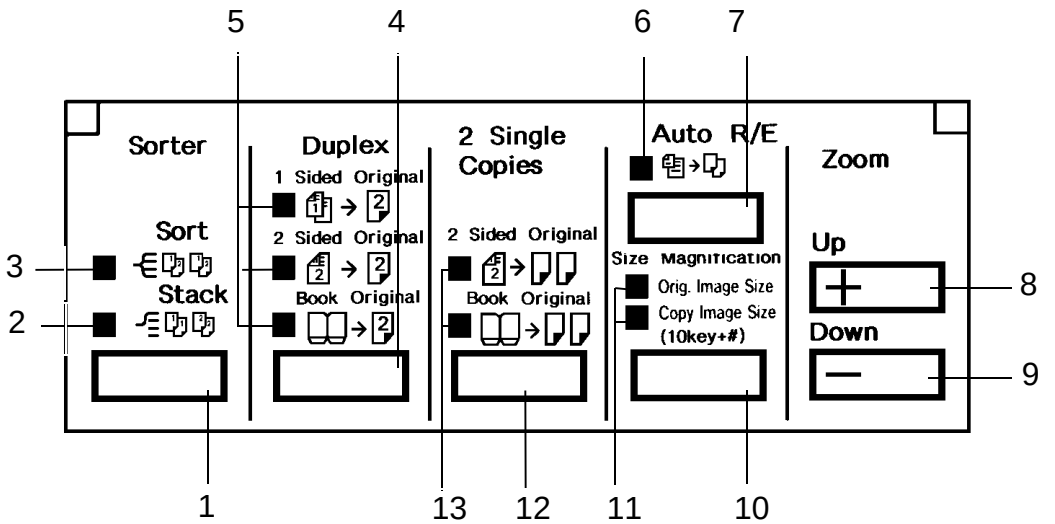
3. Sort Indicator
Lights when in the sort mode.

4. Duplex Key
Press to select one of three duplex modes. These modes are optional features requiring a duplex unit.

5. Duplex Indicators
Show which duplex copying mode is selected.

6. Auto Reduce/Enlarge Indicator
Lights when in the auto reduce/enlarge mode. This mode is an optional feature requiring a document feeder.

— LT/LDG Version —



7. Auto Reduce/Enlarge Key
Press to select the auto reduce/enlarge mode. This mode is an optional feature requiring a document feeder.

8. Zoom Up Key
Press to increase the reproduction ratio in 1% steps.

9. Zoom Down Key
Press to reduce the reproduction ratio in 1% steps.

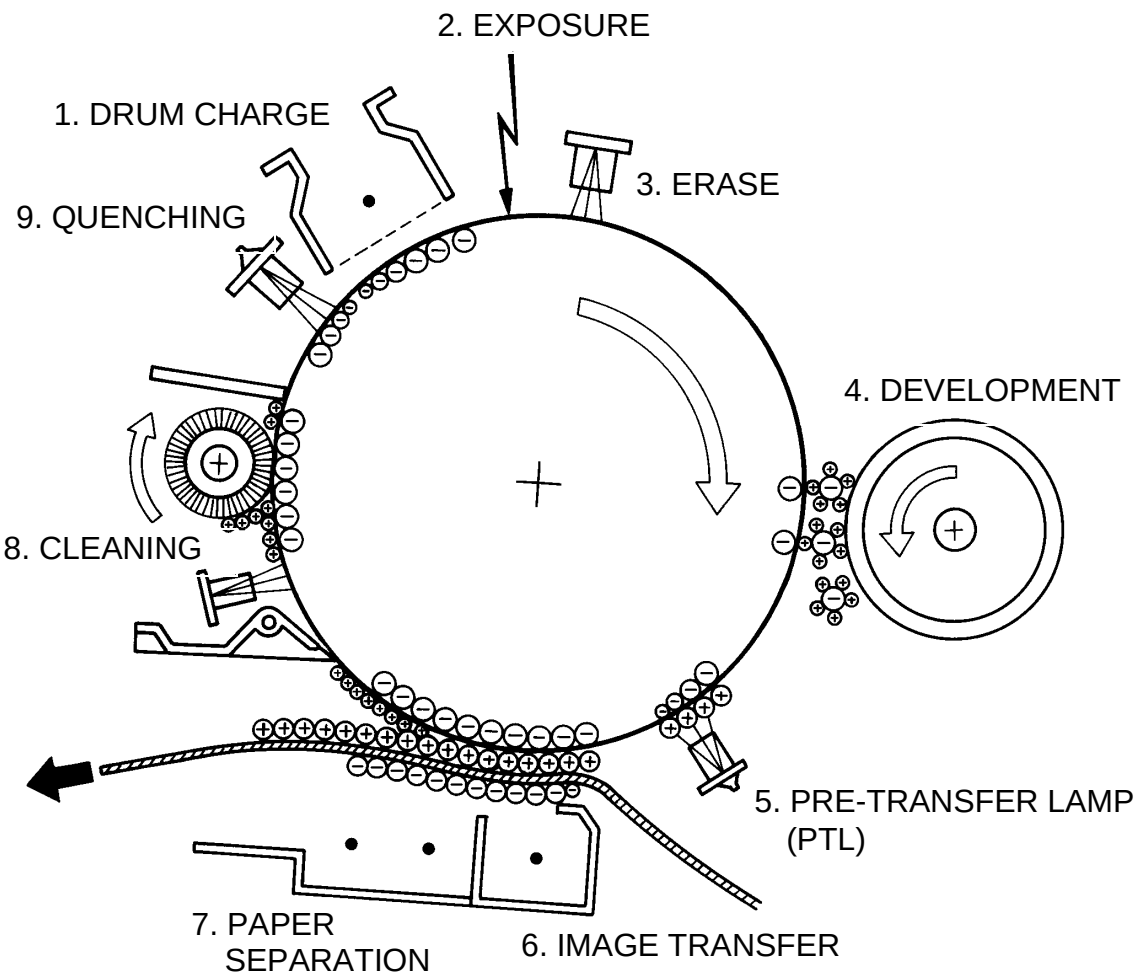
10. Size Magnification Key
Press to select the size magnification mode.

11. Size Magnification Indicators
Lights when in the size magnification mode; shows when to enter the original size and copy size data.

12. 2 Single Copies Key
Press to select one of two 2 single copies modes. The 2 Sided Original mode is an optional feature requiring a document feeder.

13. 2 Single Copies Indicators
Show which the 2 single copies mode is selected.

3. COPY PROCESSES AROUND THE DRUM



1. DRUM CHARGE

In the dark, the charge corona unit gives a uniform negative charge to the organic photoconductive (OPC) drum. The charge remains on the surface of the drum because the OPC drum has a high electrical resistance in the dark.

2. EXPOSURE

An image of the original is reflected to the OPC drum surface via the optics assembly. The charge on the drum surface is dissipated in direct proportion to the intensity of the reflected light, thus producing an electrical latent image on the drum surface.

3. ERASE

The erase lamp illuminates the areas of the charged drum surface that will not be used for the copy image. The resistance of the drum in the illuminated areas drops and the charge on those areas dissipates.

4. DEVELOPMENT

Positively charged toner is attracted to the negatively charged areas of the drum, thus developing the latent image. (The positive triboelectric charge is caused by friction between the carrier and toner particles.)

5. PRE-TRANSFER LAMP (PTL)

The PTL illuminates the drum to remove all negative charge from the exposed areas of the drum. This prevents the toner particles from being reattracted to the drum surface during paper separation and makes paper separation easier.

6. IMAGE TRANSFER

Paper is fed to the drum surface at the proper time so as to align the copy paper and the developed image on the drum surface. Then, a strong negative charge is applied to the back side of the copy paper, producing an electrical force which pulls the toner particles from the drum surface to the copy paper. At the same time, the copy paper is electrically attracted to the drum surface.

7. PAPER SEPARATION

A strong ac corona discharge is applied to the back side of the copy paper, reducing the negative charge on the copy paper and breaking the electrical attraction between the paper and the drum. Then, the stiffness of the copy paper causes it to separate from the drum surface. The pick-off pawls help to separate paper.

8. CLEANING

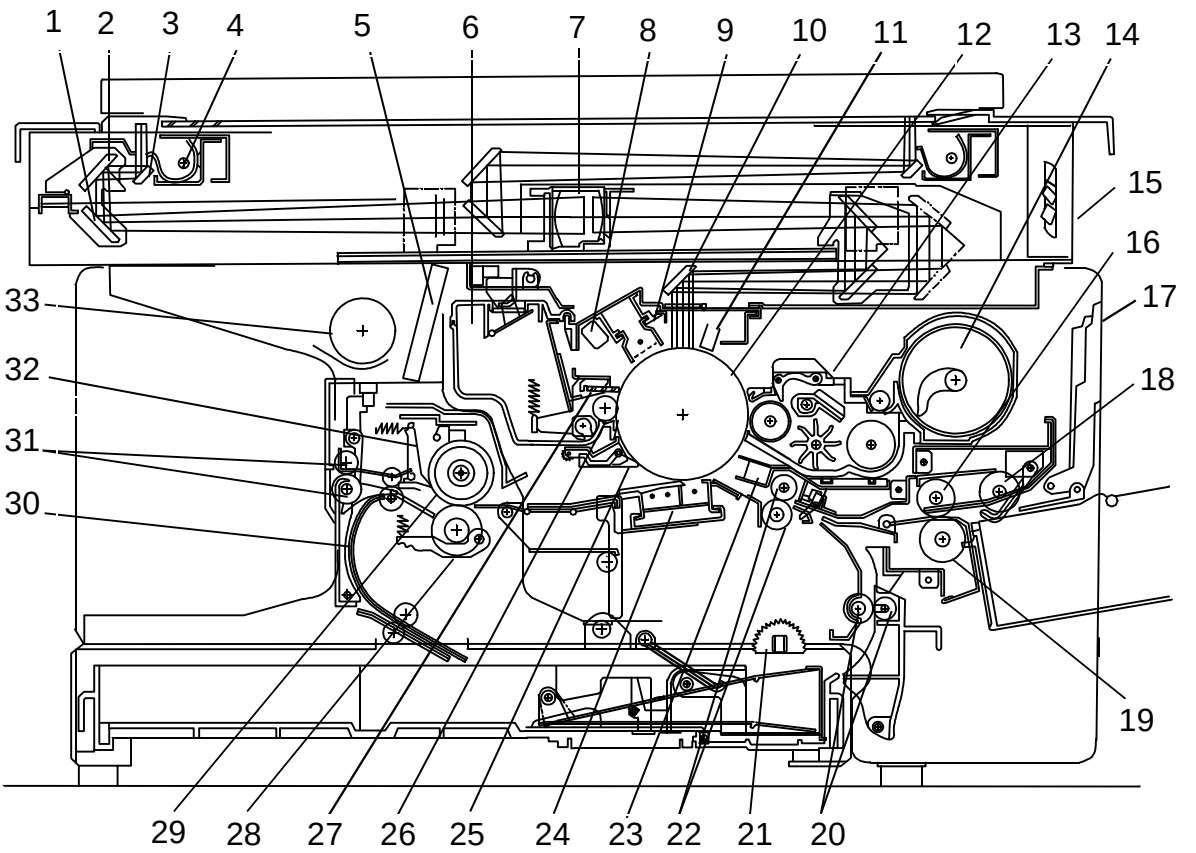
The cleaning brush removes most of the toner on the drum and loosens the remainder. Then the cleaning blade scrapes off the loosened toner.

9. QUENCHING

Light from the quenching lamp electrically neutralizes the surface of the drum.

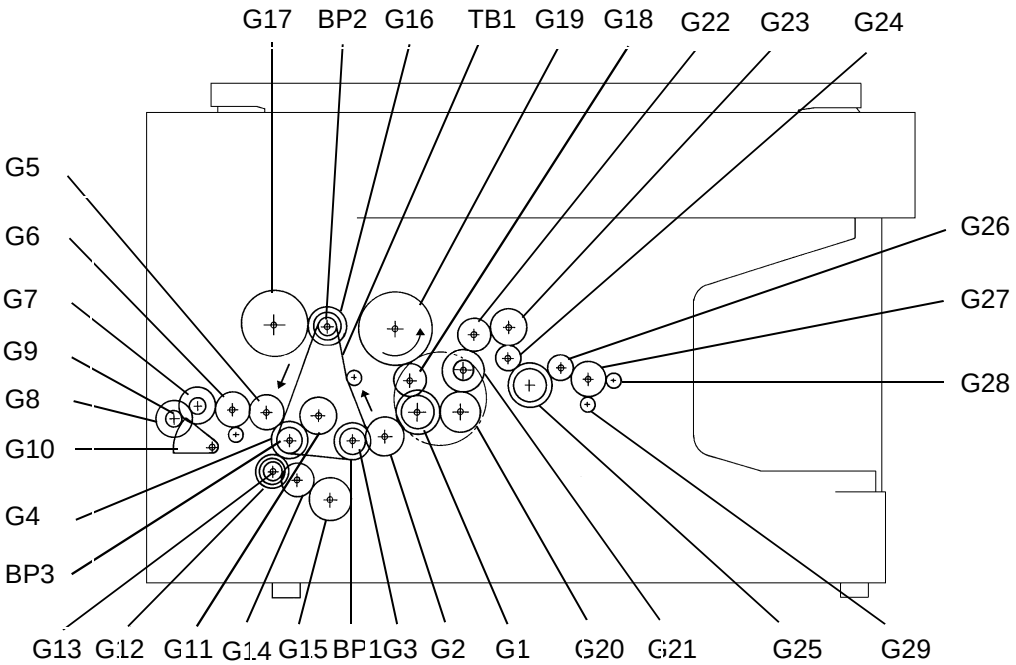
4. FUNCTIONAL OPERATION

5. MECHANICAL COMPONENT LAYOUT



1. Third Mirror
2. Second Mirror
3. First Mirror
4. Exposure Lamp
5. Ozone Filter
6. Cleaning Unit
7. Lens
8. Quenching Lamp (QL)
9. Charge Corona Unit
10. Sixth Mirror
11. Erase lamp (EL)
12. OPC Drum
13. Development Unit
14. Toner Supply Unit
15. Optics Cooling Fans
16. Feed Roller
17. Manual Feed Table
18. Pick-up Roller
19. Separation Roller
20. Relay Rollers
21. Semi-circular Feed Rollers
22. Registration Rollers
23. Pre-transfer Lamp (PTL)
24. Transfer and Separation Corona Unit
25. Pick-off Pawls
26. Cleaning Brush
27. Cleaning Blade
28. Pressure Roller
29. Hot Roller
30. Duplex Turn Guide (Option)
31. Exit Rollers
32. Hot Roller Strippers
33. Exhaust Blower

6. DRIVE LAYOUT



G1: Main Motor Gear → G2: Relay Gear → G3: Timing Belt Drive Gear → BP1: Timing Belt Pulley → TB1: Timing Belt → (A)

G1: Main Motor Gear → G18: Relay Gear → G19: Drum Drive Gear → Drum

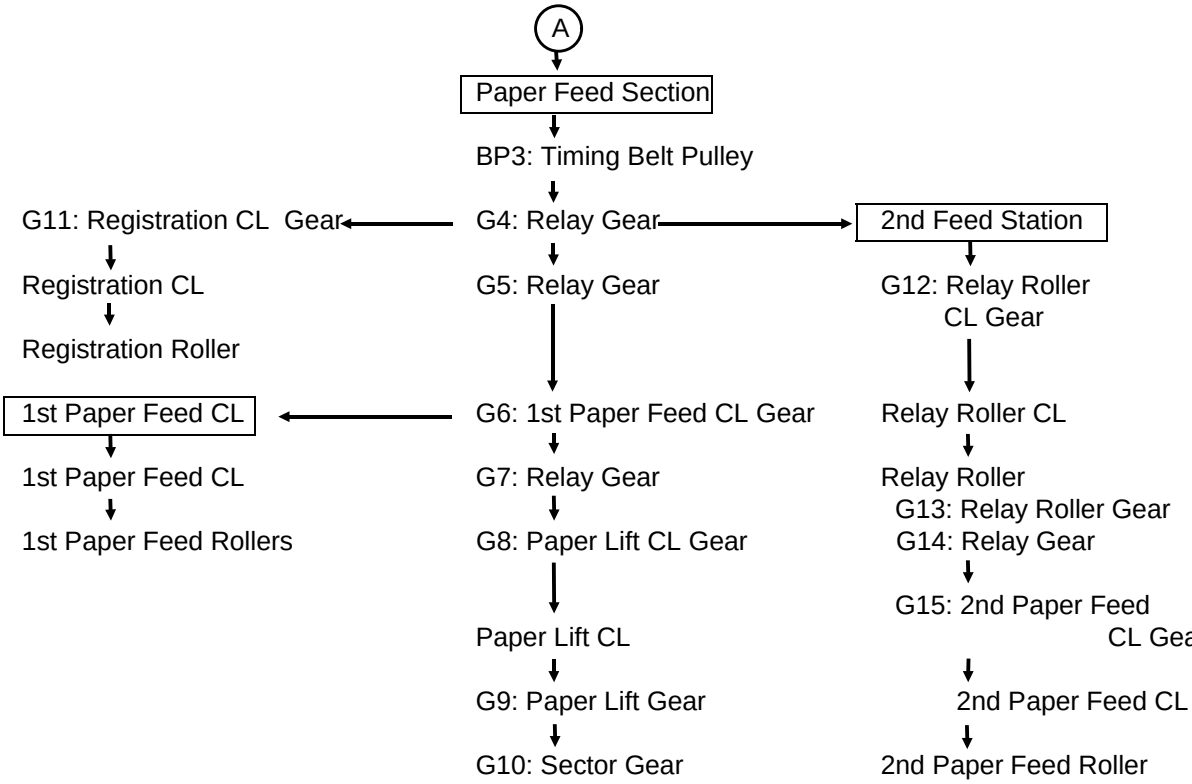
TB1: Timing Belt → Development Section → BP2: Timing Belt Pulley → G16: Development CL Gear → Development CL → Development Unit

Development CL → G17: Toner Supply CL Gear → Toner Supply CL → Toner Supply Unit

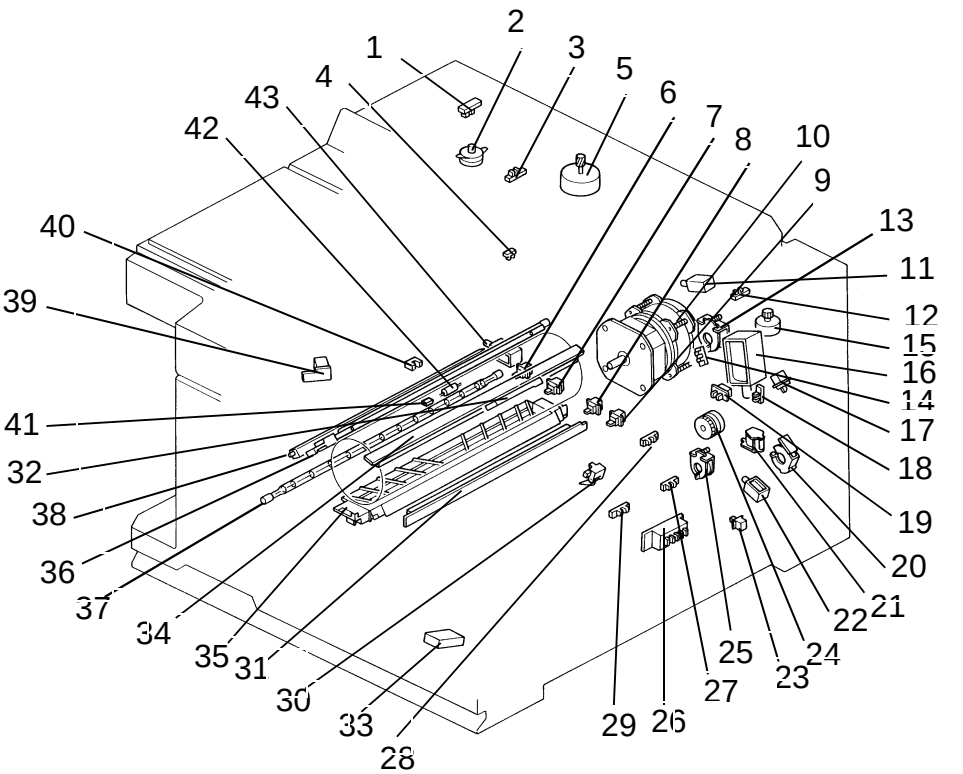
G1: Main Motor Gear → G20: Relay Gear → G21: Cleaning Drive → Cleaning Unit

G20: Relay Gear → G22: Relay Gear → Fusing and Exit Section → G23: Relay Gear → G24: Relay Gear → G25: Hot Roller Gear → G26: Relay Gear → G27: Relay Gear → G28: Exit Roller Gear

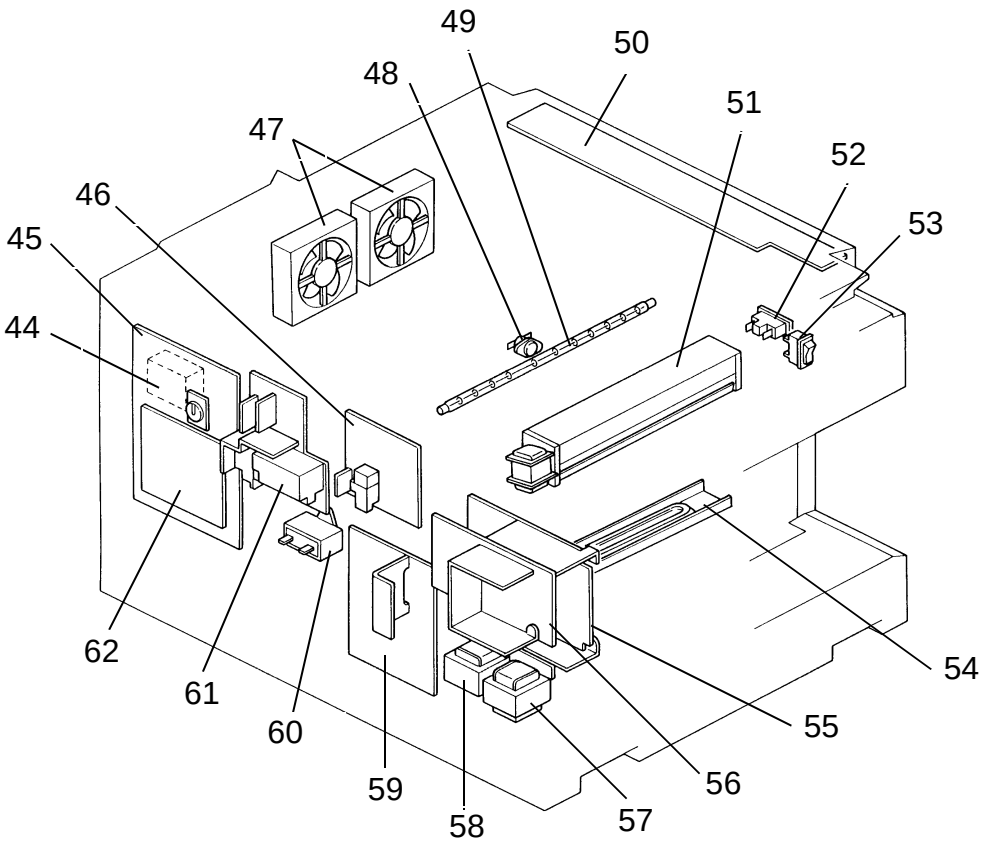
G27: Relay Gear → G29: Duplex Transp Gear (Option)


A
Paper Feed Section
BP3: Timing Belt Pulley
G4: Relay Gear
G11: Registration CL Gear
Registration CL
Registration Roller
2nd Feed Station
G5: Relay Gear
G12: Relay Roller CL Gear
Relay Roller CL
1st Paper Feed CL
G6: 1st Paper Feed CL Gear
1st Paper Feed CL
1st Paper Feed Rollers
G7: Relay Gear
G8: Paper Lift CL Gear
Paper Lift CL
G9: Paper Lift Gear
G10: Sector Gear
Relay Roller
G13: Relay Roller Gear
G14: Relay Gear
G15: 2nd Paper Feed CL Gea
2nd Paper Feed CL
2nd Paper Feed Roller

7. ELECTRICAL COMPONENT LAYOUT



1. Scanner H.P. Sensor
2. Lens Motor
3. Lens H.P. Sensor
4. Exit Sensor
5. Scanner Motor
6. 2nd Paper Size SW-1 (SW4)
7. 2nd Paper Size SW-2 (SW5)
8. 2nd Paper Size SW-3 (SW6)
9. 2nd Paper Size SW-4 (SW7)
10. Main Motor
11. Development CL Sol.
12. 4th/5th Mirror H.P. Sensor
13. Toner Supply CL Sol.
14. Toner End Sensor
15. 4th/5th Mirror Motor
16. Pick-up Roller Release Sol.
17. Manual Feed Table SW
18. Development Unit Set Sensor
19. Color Switch
20. Paper Lift CL Sol.
21. 1st Paper Feed CL Sol.
22. Relay Roller CL Sol.
23. Right Cover SW
24. Registration Clutch
25. 2nd Paper Feed CL Sol.
26. 1st Paper Size SW
27. 1st Paper End Sensor
28. 2nd Paper End Sensor
29. Cassette Lift Sensor
30. Registration Sensor
31. Pre-transfer Lamp (PTL)
32. ID Sensor
33. Total Counter
34. Erase Lamp (EL)
35. Transfer and Separation Corona Unit
36. Charge Corona Unit
37. Fusing Lamp
38. Quenching Lamp (QL)
39. Auto ID Sensor
40. Toner Overflow Sensor
41. Fusing Thermistor
42. Fusing Thermofuse
43. Tray Lock Sol.



44. Key Counter (Option)
45. Main Board
46. CC/Grid/Bias Power Pack
47. Optics Cooling Fan Motors
48. Optics Thermoswitch
49. Exposure Lamp
50. Operation Panel Board
51. Exhaust Blower Motor
52. Cover Safety SW
53. Main SW
54. Drum Anti-condensation Heater
55. Main DC Power Supply Board
56. Optional DC Power Supply Board (Option)
57. Optional Transformer (Option)
58. Main Transformer
59. AC Drive Board
60. Main Motor Capacitor
61. TC/SC Power Pack
62. Interface Board (Option)

8. ELECTRICAL COMPONENT DESCRIPTIONS

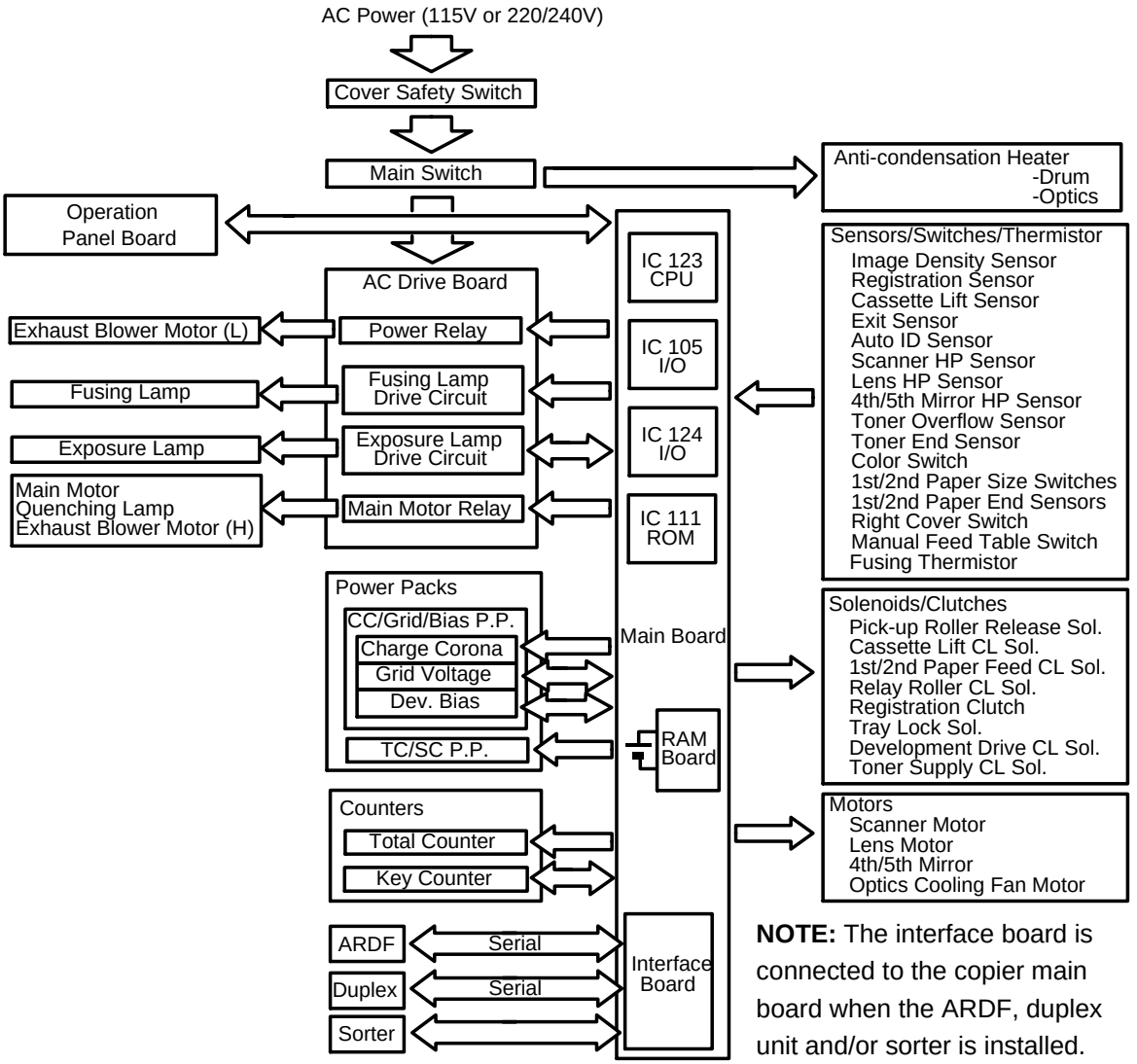
SYMBOL	NAME	FUNCTION	INDEX NO.
Motors			
M1	Main Motor	Drives all the main unit components except for the optics unit and fans. (115/220/240Vac)	10
M2	Scanner Motor	Drives the scanners (1st and 2nd). (dc stepper)	5
M3	Lens Motor	Moves the lens position according to the selected magnification. (dc stepper)	2
M4	4th/5th Mirror Motor	Move the 4th/5th mirror position according to the selected magnification. (dc stepper)	15
M5	Optics Cooling Fan Motor-1	Prevents built up of hot air in the optics cavity. (24 Vdc)	47
M6	Optics Cooling Fan Motor-2	Prevents built up of hot air in the optics cavity. (24 Vdc)	47
M7	Exhaust Blower Motor	Removes heat from around the fusing unit and blower the ozone built up around the charge section to the ozone filter.	51
Magnetic Clutch			
MC1	Registration Clutch	Drives the registration roller.	24
Solenoid			
SOL1	Toner Supply Clutch Solenoid	Drives the toner supply roller via the toner supply spring clutch.	13
SOL2	1st Paper Feed Clutch Solenoid	Starts paper feed from the first paper station.	21
SOL3	2nd Paper Feed Clutch Solenoid	Starts paper feed from the 2nd paper station.	25
SOL4	Pick-up Roller Release Solenoid	a) After the paper is fed, releases the pick-up roller from next paper. b) When the manual feed table is used, releases the pick-up roller from the table.	16
SOL5	Paper Lift Clutch Solenoid	Lifts paper to the appropriate feed position.	20
SOL6	Tray Lock Solenoid	Locks the paper tray/duplex unit.	43
SOL7	Development Clutch Solenoid	Drives the development unit.	11
SOL8	Relay Roller Clutch Solenoid	Drives the relay roller for the 2nd cassette station.	22

SYMBOL	NAME	FUNCTION	INDEX NO.
Switches			
SW1	Main Switch	Supplies power to the copier.	53
SW2	Cover Safety Switch	Cuts the ac power line.	52
SW3	1st Paper Size Switch	Determines what size paper is in the first cassette.	26
SW4	2nd Paper Size Switch-1	Determines what size paper is in the paper tray.	6
SW5	2nd Paper Size Switch-2	Determines what size paper is in the paper tray.	7
SW6	2nd Paper Size Switch-3	Determines what size paper is in the paper tray.	8
SW7	2nd Paper Size Switch-4	Determines what size paper is in the paper tray.	9
SW8	Color Switch	Determines which color development unit is installed.	19
SW9	Manual Feed Table Switch	Detects when the manual feed table is open.	17
SW10	Right Cover Switch	Detects when the right cover is open.	23
Sensor			
S1	Scanner Home Position Sensor	Informs the CPU when the 1st scanner is at the home position.	1
S2	Lens Home Position Sensor	Informs the CPU when the lens is at the home position (full size position).	3
S3	4th/5th Mirror Home Position Sensor	Informs the CPU when the 3rd scanner (4th/5th mirrors assembly) is at the home position (full size position).	12
S4	Registration Sensor	Detects misfeeds.	30
S5	Exit Sensor	Detects misfeeds.	4
S6	1st Paper End Sensor	Informs CPU when the first cassette runs out of paper.	27
S7	2nd Paper End Sensor	Informs CPU when the paper tray runs out of paper.	28
S8	Toner End Sensor	Detects when it is time to add toner.	18
S9	Toner Overflow Sensor	Detects when the used toner tank is full.	40
S10	Paper Lift Sensor	Detects the correct feed height of the cassette.	29

SYMBOL	NAME	FUNCTION	INDEX NO.
S11	Image Density (ID) Sensor	Detects the density of the image on the drum to control the toner density.	32
S12	Development Unit Set Sensor	Sensors whether or not the development unit is properly set.	18
Printed Circuit Board			
PCB1	Main Board	Controls all copier functions both directly and through the other PCBs.	45
PCB2	AC Drive Board	Drives all ac motors, the exposure lamp, fusing lamp, quenching lamp, exhaust blower motor.	59
PCB3	Main DC Power Supply Board	Rectifies 26 and 10 Vac input and outputs dc voltages.	55
PCB4	Auto Image Density Sensor (ADS)	Senses the background density of the original.	39
PCB5	Optional DC Power Supply Board	Rectifies 26 and 10 Vac input and outputs dc voltasges.	56
PCB6	Interface Board	Interfaces between the copier main board and all the optional equipment's main board.	62
PCB7	Operation Panel Board	Informs the CPU of the selected modes and displays the situations on the panel.	50
Lamps			
L1	Exposure Lamp	Applies high intensity light to the original for exposure.	49
L2	Fusing Lamp	Provides heat to the hot roller.	37
L3	Quenching Lamp	Neutralizes any charge remaining on the drum surface after cleaning.	38
L4	Erase Lamp	Discharge the drum outside of the image area. Provides leading/trailing edge erase.	34
L5	Pre-transfer Lamp	Reduces charge on the drum surface before transfer.	31
Power Packs			
P1	CC/Grid/Bias Power Pack	Provides high voltage for the charge corona, grid, and the development roller bias.	46
P2	TC/SC Power Pack	Provides high voltage for the transfer and separation corona.	61

SYMBOL	NAME	FUNCTION	INDEX NO.
Heaters			
H1	Drum Anti-condensation Heater	Prevents moisture around the drum.	54
H2	Optics Anti-condensation Heater Option	Prevents moisture from forming on the optics.	N/A
Counters			
CO1	Total Counter	Keeps track of the total number of copies made.	33
CO2	Key Counter (Option)	Used for control of authorized use. Copier will not operate until installed.	44
Transformer			
TR1	Main Transformer	Steps down the wall voltage to 26 Vac and 10 Vac.	58
TR2	Optional Transformer	Steps down the wall voltage to 26 Vac and 10 Vac for the document feeder and duplex unit.	57
Others			
TH	Fusing Thermistor	Monitors the fusing temperature.	41
TF	Fusing Thermofuse	Provides back-up overheat protection in the fusing unit.	42
TS	Optics Thermoswitch	Provides back-up overheat protection around the exposure lamp.	48
C	Main Motor Capacitor	Start capacitor	60

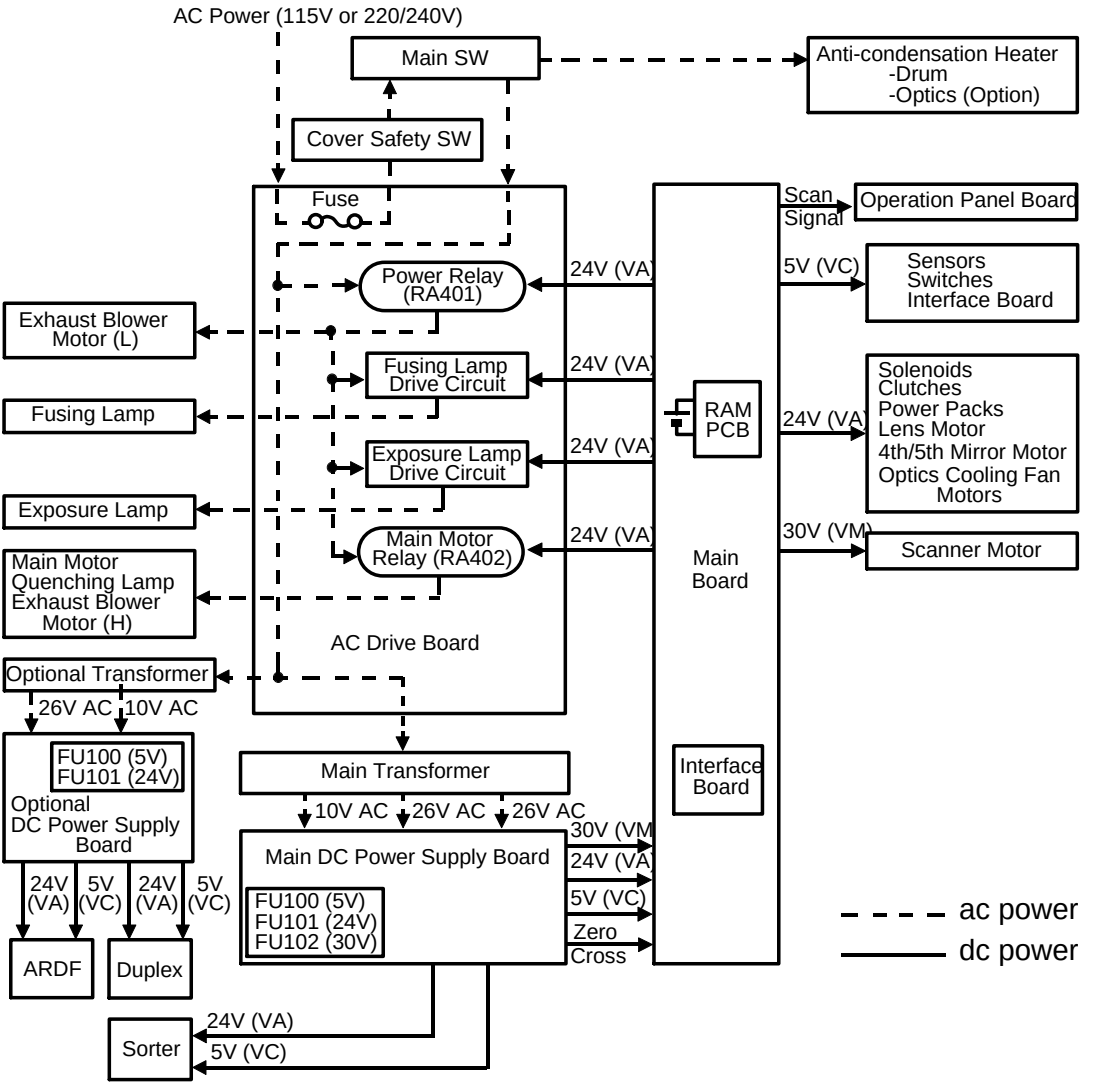
9. OVERALL MACHINE CONTROL



NOTE: The interface board is connected to the copier main board when the ARDF, duplex unit and/or sorter is installed.

The above diagram shows the control system of this copier in block form. The CPU (IC123) on the main board controls the timing of all copier's operation based on the CPU's internal clock. The CPU monitors the input signals from all sensors and controls the dc components directly or through two I/O chips (IC 105 and IC 124). It also controls ac components such as the fusing lamp, exposure lamp, main motor quenching lamp, and exhaust blower motor (High speed) directly via the ac drive board. The exhaust blower motor (Low speed) is controlled via the I/O chip (IC 124) and ac drive board. The charge corona, grid voltage and development bias are powered by the same power pack (P1) but are controlled separately as shown above. The main board has a RAM board for the service program mode and misfeed recovery. A battery backs up the power to the RAM board.

10. AC POWER AND DC POWER DISTRIBUTION



When this copier is plugged in and the main switch is turned off, ac power is supplied via the ac drive board to the anti-condensation heater. When the front cover and/or the exit cover is open, the cover safety switch completely cuts off power to all ac and dc components. The RAM board has a back up power supply (dc battery) for the service program mode and misfeed job recovery.

When the main switch is turned on, the ac power supply to the anti-condensation heater is cut off and ac power is supplied to the ac drive board. The main transformer receives wall outlet ac power through the ac drive board and outputs 10 volts ac and 26 volts ac to the main dc power supply board.

The main dc power supply board converts the 10 volts ac input to +5 volts and a zero cross signal. There are two 26 volts ac inputs. The dc power supply board converts them to +24 volts and +30 volts.

The +5 volts and +24 volts are supplied to both the copier main board and the sorter main board. The zero cross signal and +30 volts are supplied to the copier main board.

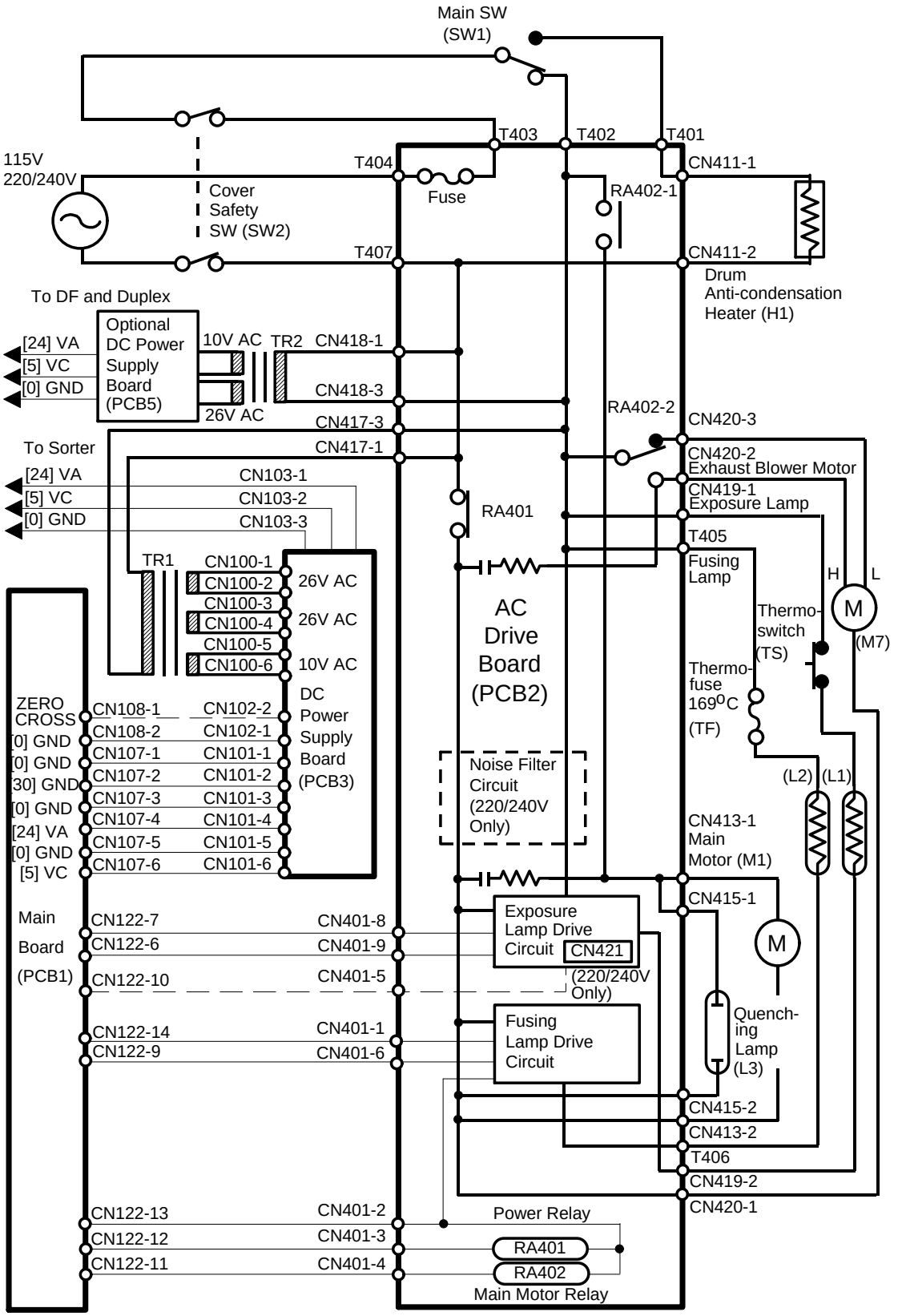
The copier main board supplies dc powers to all copier dc components. All sensors, and switches plus the interface board operate on +5 volts. The scanner motor operates on +30 volts. All other dc components including the power relay (RA401) and the main motor relay (RA402) operate on +24 volts. The ARDF and the duplex unit have a separate dc power supply.

When the main board receives power, it activates the power relay (RA401) which then supplies ac power to the fusing lamp drive circuit, and the exposure lamp drive circuit on the ac drive board. The exhaust blower motor begins rotating at low speed. The fusing lamp drive circuit receives a trigger signal from the main board and the fusing lamp lights. The exposure lamp does not turn on until the main board send a trigger pulse to the exposure lamp drive circuit.

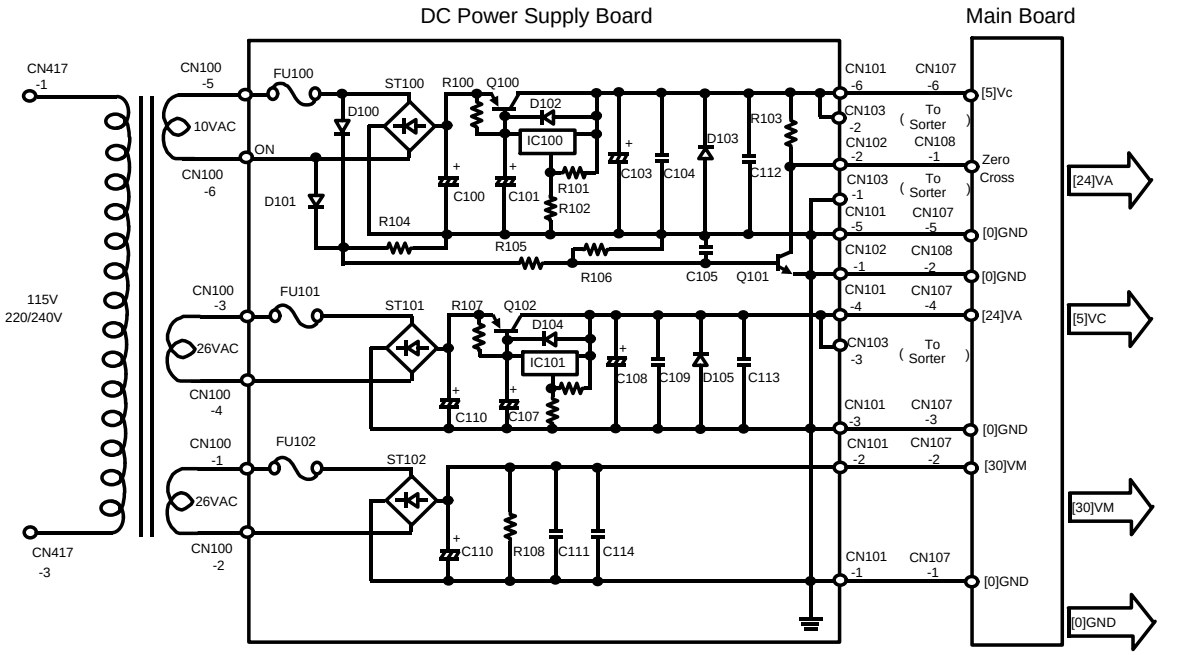
When the Start key is pressed, the main board energizes the main motor relay (RA402). Then, the main motor and the quenching lamp turn on and the exhaust blower starts rotating at high speed.

When the main switch is turned off, power is cut off to the main board and to RA401, and the drum and optional anticondensation heaters are turned on. The exposure lamp and the fusing lamp power lines are completely disconnected from the line voltage.

10.1 AC POWER DISTRIBUTION



10.2 DC POWER DISTRIBUTION



SECTION 2

SECTIONAL DESCRIPTION

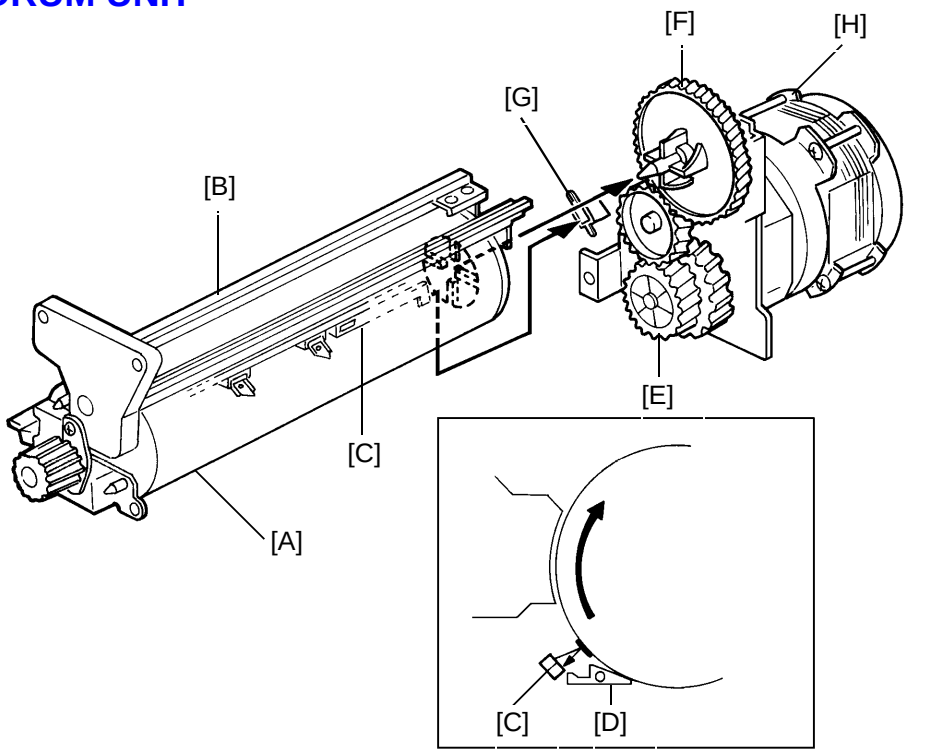
1. DRUM

1.1 OPC DRUM CHARACTERISTICS

An OPC has the characteristics of:

1. Being able to accept a high negative electrical charge in the dark. (The electrical resistance of a photoconductor is high in the absence of light.)
2. Dissipating the electrical charge when exposed to light. (Exposure to light greatly increases the conductivity of a photoconductor.)
3. Dissipating an amount of charge in direct proportion to the intensity of the light. That is, where stronger light is directed to the photoconductor surface, a smaller voltage remains on the OPC.
4. Being less sensitive to changes in temperature (when compared to selenium F type drums). This makes it unnecessary to monitor and control the drum temperature.

1.2 DRUM UNIT



An organic photoconductor drum [A] is used on this model.

A drum unit [B] is used to hold the drum to prevent stress on the drum. The drum unit consists of an OPC drum, ID sensor [C] and pick-off pawls [D]. When the drum is replaced, and/or the pick-off pawls and/or the ID sensor are cleaned, the drum unit must be removed from the copier as a unit.

The drum is driven by the main motor [H] through the main motor gear [E], a relay gear and the drum drive gear [F]. The pick-off pawls [D] are always in contact with the drum surface. The ID sensor is electrically connected to the ID sensor connector [G].

1.3 HANDLING THE DRUM

The organic photoconductor drum is comparatively more sensitive to light and ammonia gas than a selenium drum.

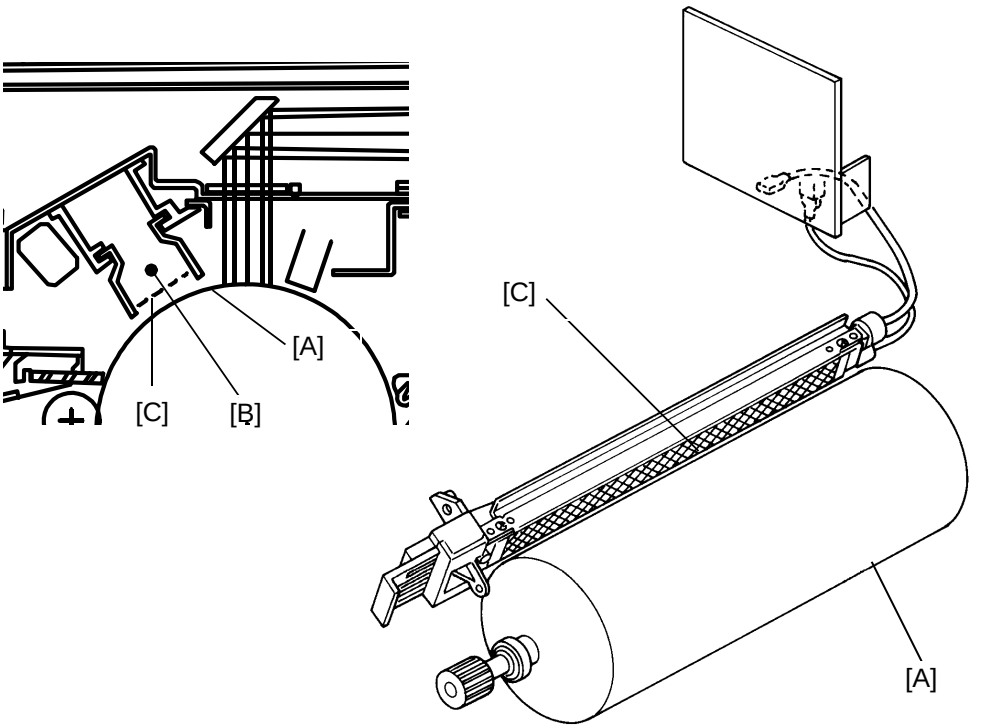
1. Never expose the drum to direct sunlight.
2. Never expose the drum to direct light of more than 1,000 Lux for more than a minute.
3. Never touch the drum surface with bare hands. When the drum surface is touched with a finger or becomes dirty, wipe with a dry cloth or clean with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
4. Never use alcohol to clean the drum; alcohol dissolves the drum surface.
5. Store the drum in a cool, dry place away from heat.
6. Take care not to scratch the drum as the drum layer is thin and is easily damaged.
7. Never expose the drum to corrosive gases such as ammonia gas.
8. Always keep the drum in the protective sheet when inserting or pulling the drum unit out of the copier to avoid exposing it to bright light or direct sunlight. This will protect the drum from light fatigue.
9. Before inserting or pulling out the drum unit, the following should be performed to avoid damaging the drum:
    a) Remove the cleaning unit.
    b) Remove the development unit.
    c) Remove the charge corona unit.
    d) Release the transport unit.
10. Before pulling out the drum unit, place a sheet of paper under the drum to catch any dropped toner.
11. Drum initial setting (SP #66) must be performed when a new drum is installed.

NOTE: This is not necessary at installation of a new machine as the drum initial setting is performed at the factory.

12. Dispose of the used drum according to local regulations.

2. DRUM CHARGE

2.1 OVERVIEW



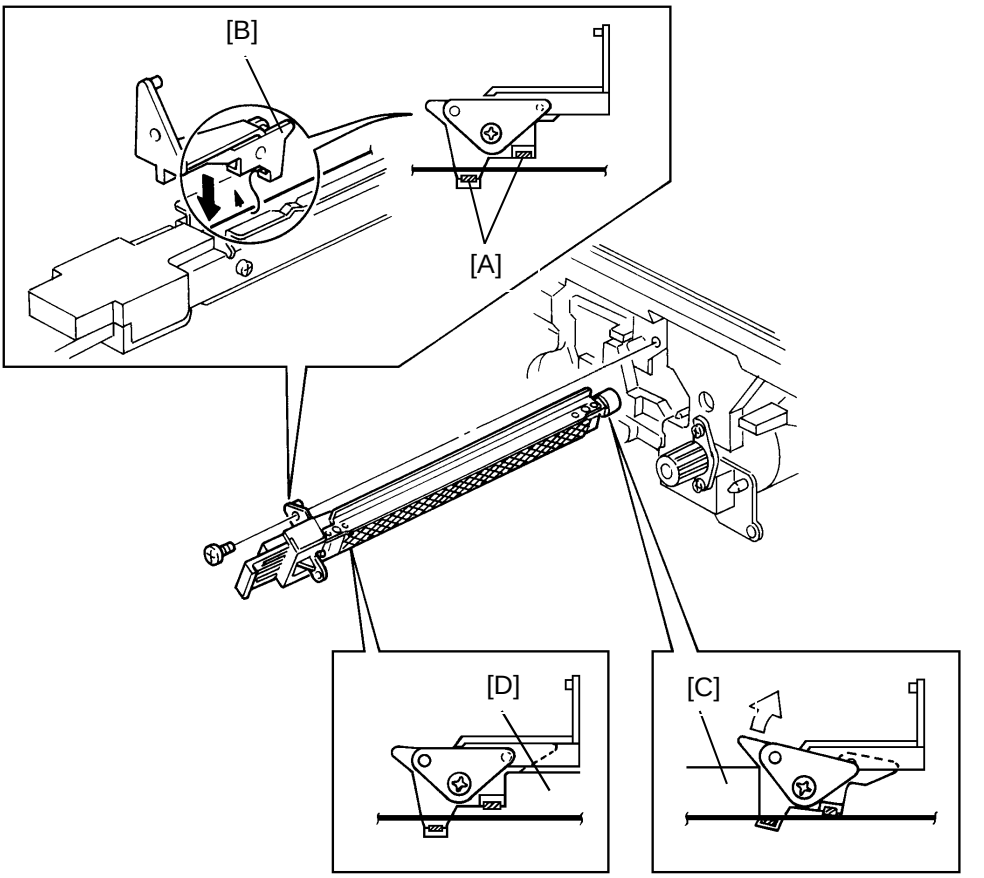
This copier uses a single wire scorotron and a highly sensitive OPC drum [A]. The corona wire [B] generates a corona of negative ions when the CC/B/G power pack applies a high voltage. A stainless steel grid plate [C] makes the corona charge uniform. The drum coating receives a uniform negative charge as it rotates past the corona unit.

The exhaust blower, located above the copy exit, causes a flow of air from the upper area of the development unit through the charge corona unit. This prevents uneven build-up of negative ions that can cause uneven image density. The exhaust blower runs at half speed when in the stand-by condition and runs at full speed while copying.

The exhaust blower has an ozone filter (active carbons) which adsorbs ozone (O_3) generated by the corona discharge. The ozone filter decreases in efficiency over time as it adsorbs ozone. The ozone filter should be replaced at every 60,000 copies.

The flow of air around the charge corona wire may deposit paper dust or toner particles on the corona wire. These particles may interfere with charging and cause low density bands on copies. The wire cleaner cleans the corona wire when the operator slides the corona unit in and out.

2.2 CHARGE CORONA WIRE CLEANER MECHANISM



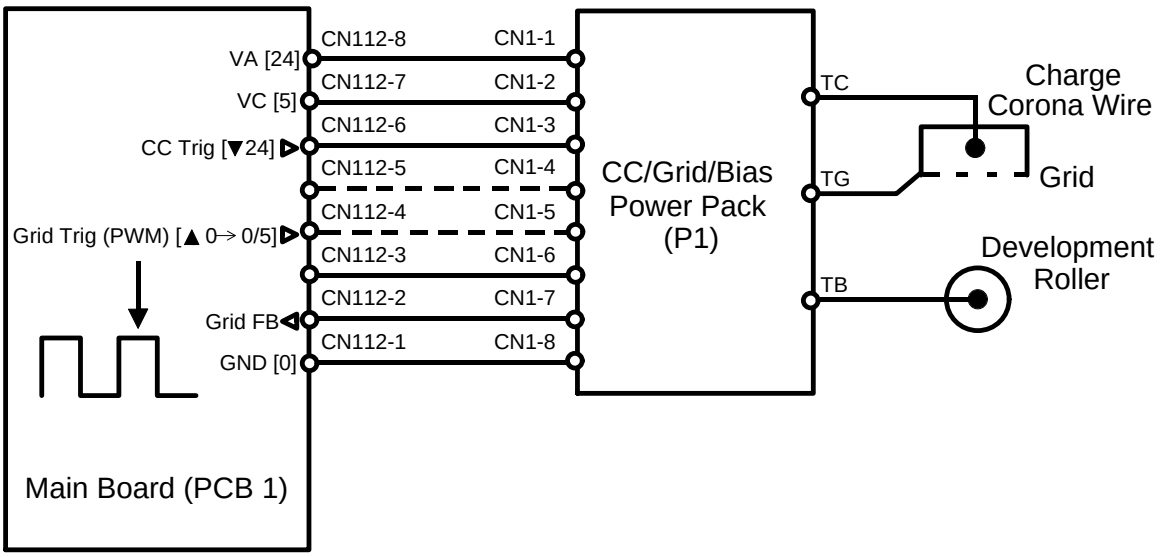
Pads [A] above and below the charge corona wire clean the wire as the charge unit is manually slid in and out.

The cleaner pad bracket [B] rotates when the charge unit is fully extended and the bracket is pulled up against the rear block [C]. This moves the pads against the corona wire (see illustration). If the charge unit is not fully extended, the pads do not touch the corona wire.

The pads move away from the wire when the charge unit is fully inserted and the cleaning bracket is pushed against the front block [D].

After copier installation the key operator should be instructed how to use this mechanism when copies have white streaks.

2.3 CHARGE CORONA CIRCUIT



The main board supplies +24 volts to the CC/Grid/Bias power pack at CN1-1 as the power supply source. About 0.44 seconds after the Start key is pressed, the CPU drops CN1-3 from +24 volts to 0 volts. This energizes the charge corona circuit within the CC/Grid/Bias power pack, which applies a high negative voltage of approximately –5.6 kv to the charge corona wire. The corona wire then generates a negative corona charge.

The grid limits the charge voltage to ensure that the charge does not fluctuate and an even charge is applied to the drum surface.

The grid trigger pulse applied to CN1-5 is a pulse width modulated signal (PWM signal). This signal is not only a trigger signal; it also changes the voltage level of the grid. As the width of the pulse applied increases, the voltage of the grid also increases. The CPU monitors the grid voltage at CN1-7 and controls the width of the grid trigger pulses based on this feedback.

2.4 GRID VOLTAGE CORRECTION

There are two grid voltage correction factors. These correct for increases in the drum residual voltage (Vr). The first such factor, Vr correction, is done every 1,000 copies. Vr correction is based on the data of the drum counter (SP #69) and the Vr correction ratio (L) (SP #67). The second factor, Vp correction, corrects for changes in the photoconductor's chargeability. (The chargeability of a new OPC drum may change after installation, but this stabilizes at around 2,000 copies.) Vp correction is based on the drum counter. The counter resets to "0" when drum initial setting (SP mode #66) is performed.

Both correction factors are applied to the copy process as follows:

1. Image area

Grid Voltage = –920 volts
+
Vr Correction Factor.

Vr Correction Factor

L	Change of Grid Voltage
100 to 89 (%)	±0 (volts)
88 to 76 (%)	–40 (volts)
75 to 62 (%)	–80 (volts)
61 to 45 (%)	–120 (volts)
44 to 0 (%)	–160 (volts)

L = Vrp/Vsg x 100 (Vr correction ratio)
Vrp: ID sensor output for Vr correction pattern
Vsg: ID sensor output for bare drum

2. Non-image area

Grid Voltage = 0 volts (Fixed)

3. ID sensor pattern area

Grid Voltage = –620 volts
+
Vp Correction Factor

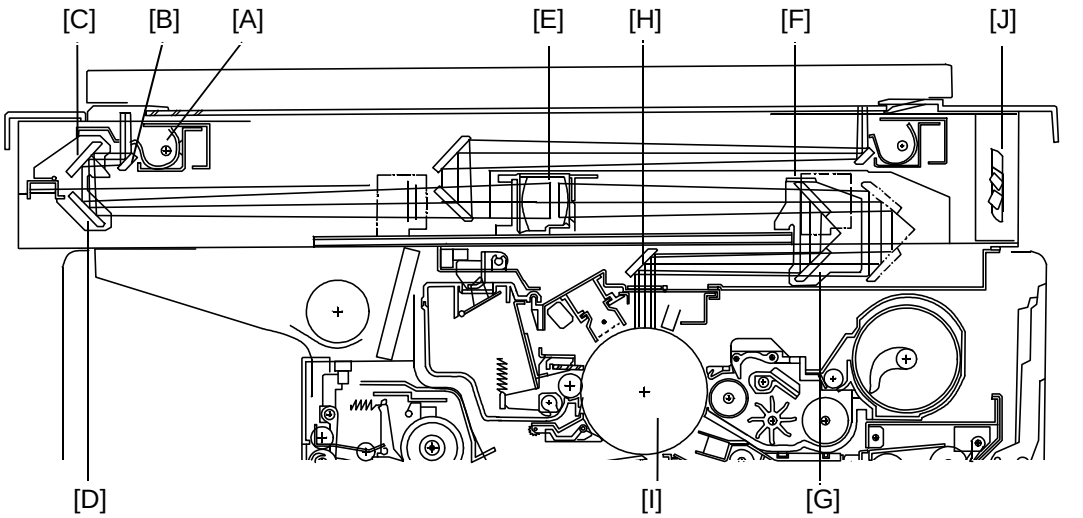
Drum Counter	Vp Correction Factor	
	Black	Color
0 to 999 (copies)	±0 (volts)	±0 (volts)
1,000 to 1,999 (copies)	–20 (volts)	±0 (volts)
Over 2,000 (copies)	–40 (volts)	–20 (volts)

4. Vr correction pattern area

Grid Voltage = –500 volts (Fixed)

3. OPTICS

3.1 OVERVIEW



During the copy cycle, an image of the original is reflected onto the drum surface through the optics assembly as follows.

Light Path:

Exposure Lamp [A] → Original → First Mirror [B] → Second Mirror [C] → Third Mirror [D] → Lens [E] → Fourth Mirror [F] → Fifth Mirror [G] → Sixth Mirror [H] → Drum [I]

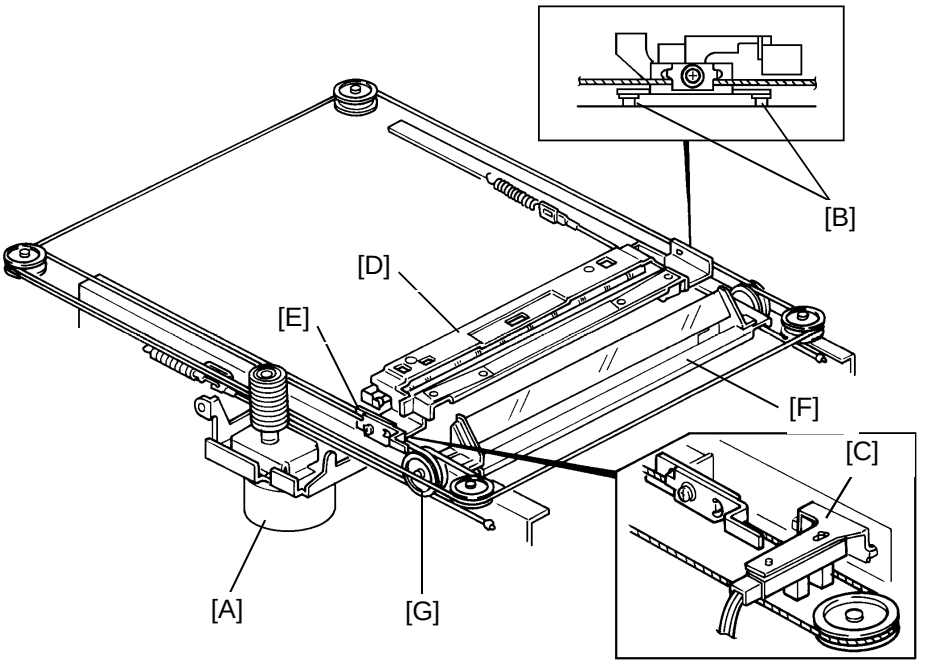
The two optics cooling fans [J] draw cool air into the optics cavity. The air flows from the right to the left in the optics cavity and exhausts through the vents in the left cover. These fans operate during the copy cycle.

This copier has six standard reproduction ratios: Three reduction ratios, two enlargement ratios, and full size. It also has a zoom function. The operator can change the reproduction ratio in one percent steps from 50% to 200%.

Stepper motors are used to change the positions of the lens and mirrors. Separate motors are used because the wide range of reproduction ratios makes it mechanically difficult for one motor to position both the lens and mirrors. A stepper motor is also used to drive the scanner. This motor changes the scanner speed according to the reproduction ratio.

The thermoswitch opens at 130 °C and removes ac power to the exposure lamp to prevent overheating. The thermoswitch can be reset manually when the exposure lamp area cools.

3.2 SCANNER DRIVE



3.2.1 1st and 2nd Scanner Drive Mechanism

This model uses a stepping motor [A] to drive the scanners. Both ends of each scanner are driven to prevent skewing. The scanners have sliders [B], which ride on guide rails.

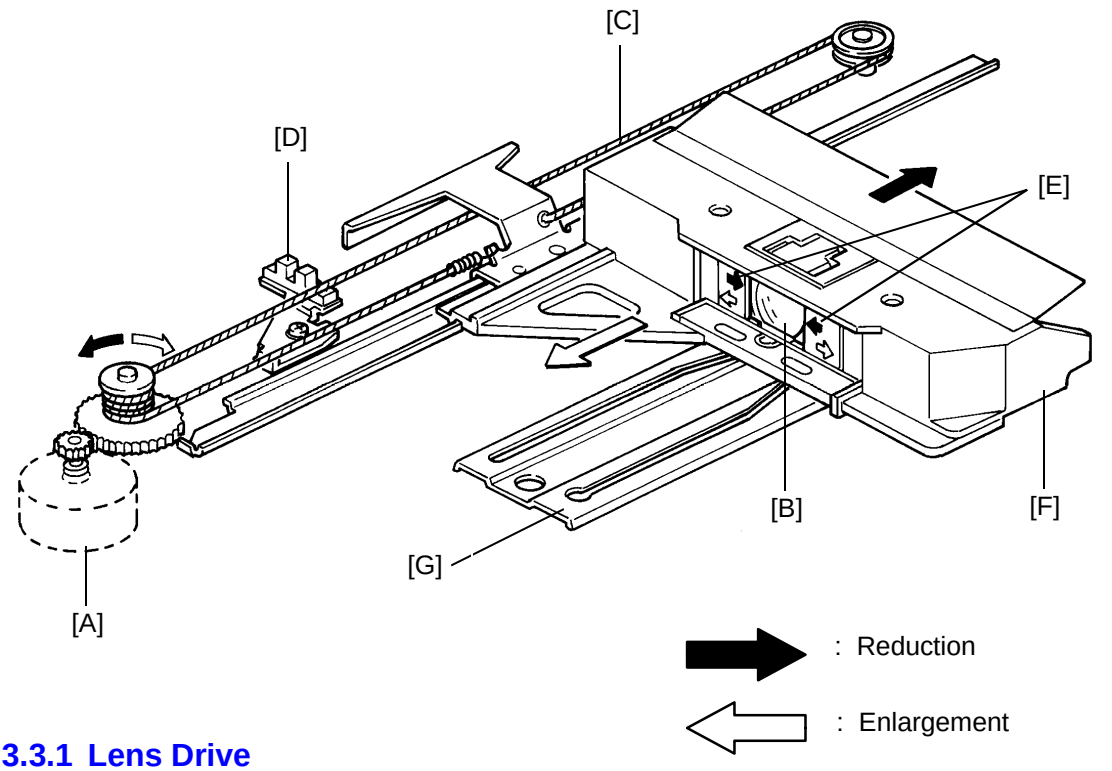
The scanner home position is detected by the home position sensor [C]. The scanner return position is determined by counting the scanner motor drive pulses.

The first scanner [D], which consists of the exposure lamp and the first mirror, is connected to the scanner drive wire by the wire clamps [E]. The second scanner [F], which consists of the second and third mirrors, is connected to the scanner drive wire by movable pulleys (the second scanner pulley [G]).

The pulley moves the second scanner at half the velocity of the first scanner. This is to maintain the focal distance between the original and the lens during scanning. This relationship can be expressed as:

V1r = 2 (V2r) = VD/r
where r = Reproduction ratio
V1r = First scanner velocity (when the reproduction ratio is "r")
V2r = Second scanner velocity (when the reproduction ratio is "r")
VD = Drum peripheral velocity (120 mm/s)

3.3 LENS DRIVE



3.3.1 Lens Drive

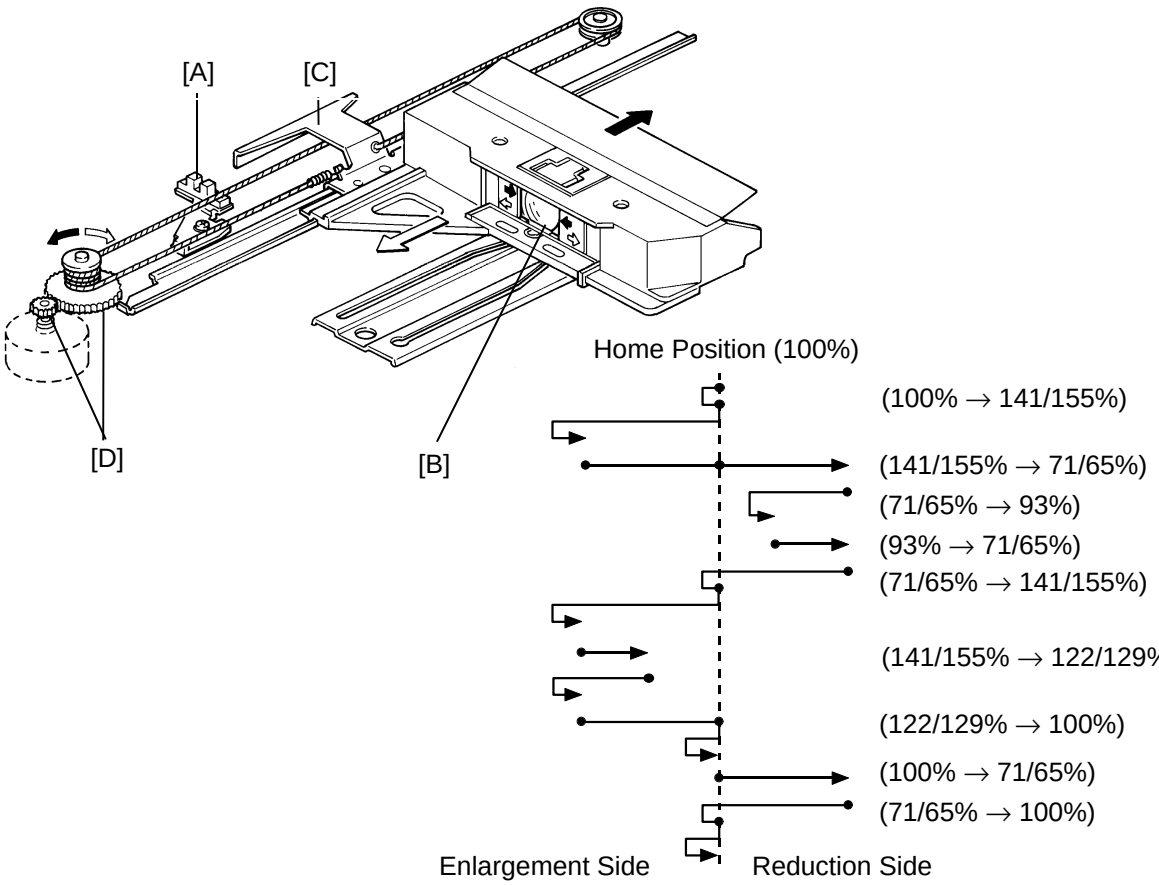
The lens motor [A] (stepper motor) changes the lens [B] position through the lens drive wire [C] in accordance with the selected reproduction ratio to provide the proper optical distance between the lens and the drum surface.

The rotation of the lens drive pulley moves the lens back and forth in discrete steps. The home position of the lens is detected by the home position sensor [D]. The main board keeps track of the lens position based on the number of pulses sent to the lens motor.

3.3.2 Shading Mechanism

The shading plates [E] are installed on the lens housing [F] and are slid open and shut by the shading cam [G]. This shading mechanism adjusts the horizontal light intensity, which becomes uneven in reduction mode, when the light at both edges is more intense. The shading plates close in reduction mode to even out the light intensity.

3.3.3 Lens Positioning



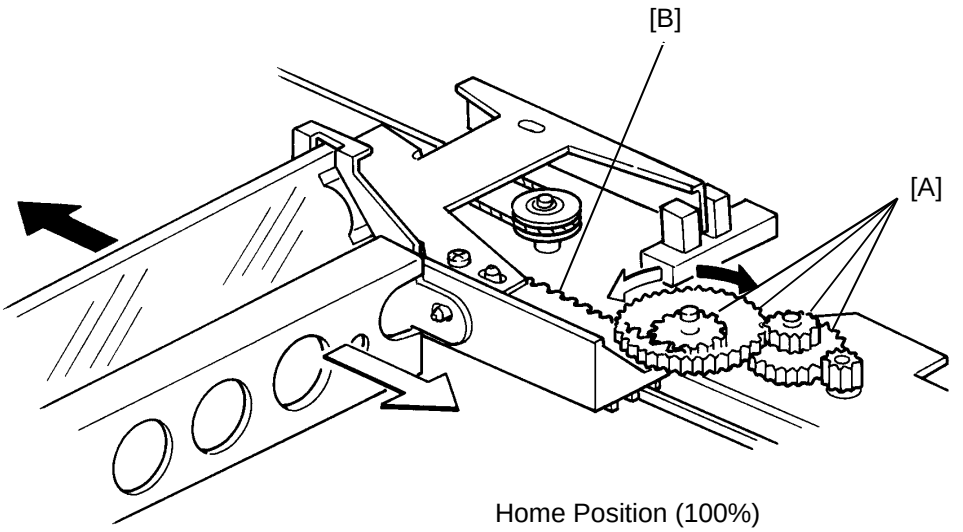
The lens home position sensor [A] informs the main board when the lens is at full size position (home position). The main board determines the lens stop position in reduction and enlargement modes by counting the number of steps the motor makes with reference to the lens home position. When a new reproduction ratio is selected, the lens [B] moves directly to the selected magnification position.

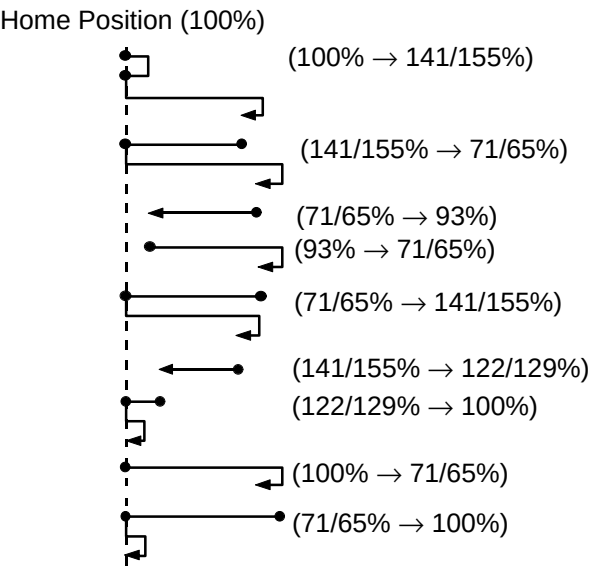
The lens home position is registered each time the lens starts from or passes through the lens home position sensor. As the lens moves from the enlargement side to the reduction side, the sensor registers the home position. This occurs when the actuator plate [C] enters the lens home position sensor.

A small vibration can be observed when the lens moves through home position from the reduction side to the enlargement side because the lens is going in the wrong direction to register the home position. The lens overshoots the home position by only one pulse before going back to register the home position.

The lens always stops while moving from left to right (as viewed from the front) to minimize the error caused by mechanical play in the drive gears [D].

3.4 4TH AND 5TH MIRROR DRIVE





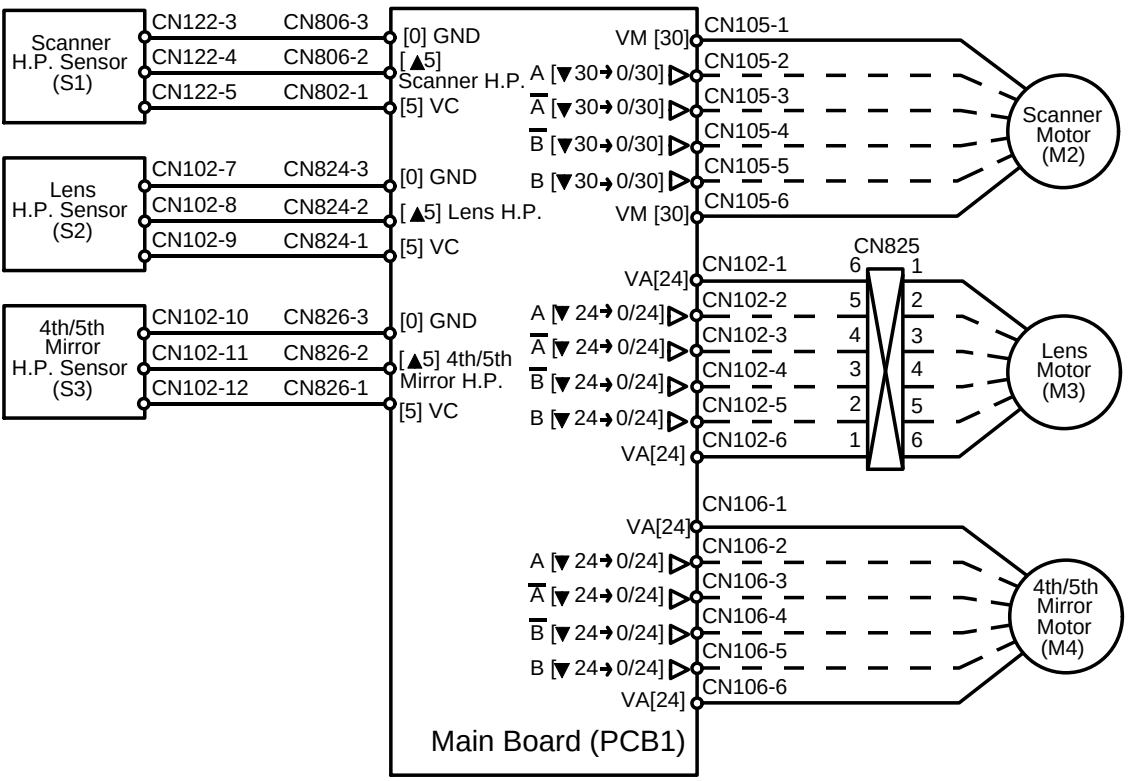
3.4.1 Drive

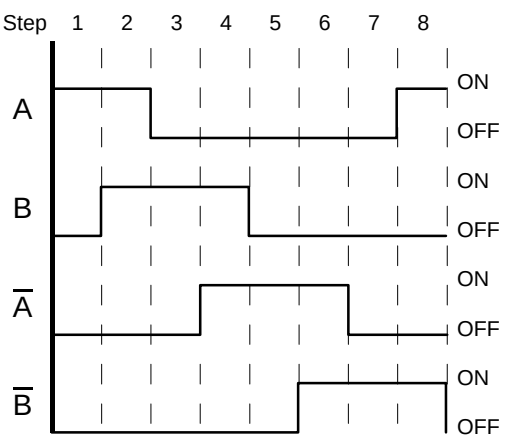
The 4th/5th mirror drive motor (stepper motor) changes the 4th/5th mirror assembly position through the pinion gears [A] and the rack gear [B] in accordance with the selected reproduction ratio to provide the proper optical distance between the lens and drum surface.

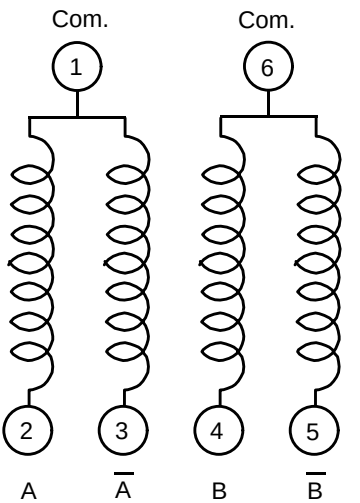
3.4.2 Positioning

The positioning mechanism is similar to that of lens positioning, as shown in the above positioning chart. The scanner always stops while moving from right to left (as viewed from the front).

3.5 STEPPER MOTOR CONTROL CIRCUIT





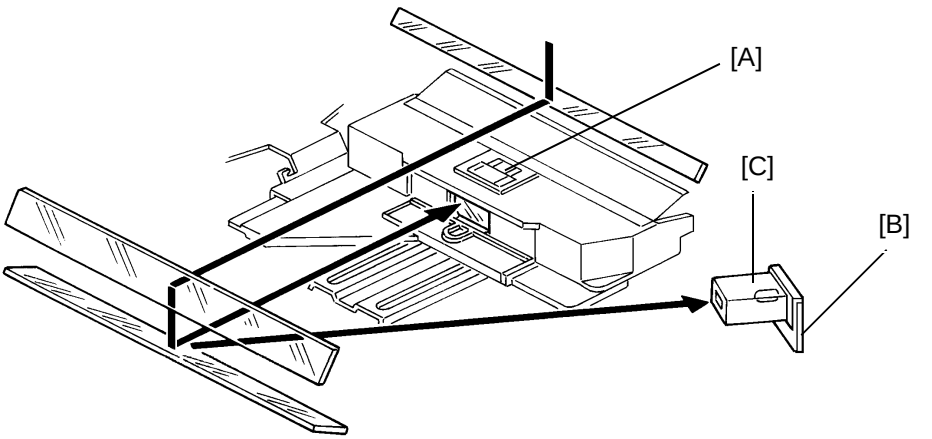


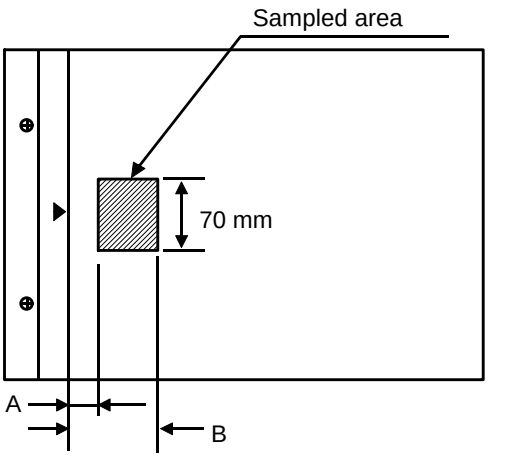
The scanner motor, the lens motor, and the 4th/5th mirror motor are all stepper motors. The scanner motor operates on +30 volts. Both the lens motor and the 4th/5th mirror motor operate on +24 volts. The stators of these stepper motors have four coils (labeled A, B, Ā, B̄ above), and the rotor is made of permanent magnets. Pulse signals energize the four coils as shown in the above illustration. The rotors of these motors turn in discrete steps, and 48 steps are required for one revolution.

The lens motor and the 4th/5th mirror motor move at a constant speed, but the scanner motor speed varies according to the reproduction ratio. The CPU changes the pulse rate (pulse per second) to adjust the speed for the selected reproduction ratio.

HP sensors inform the main board when the first scanner, lens, and 4th/5th mirror assembly reach their respective home positions. The main board determines the stop position by counting the number of steps the motor makes with reference to the home position.

3.6 AUTOMATIC IMAGE DENSITY DETECTION





Light from the exposure lamp is reflected from the original and travels to the lens [A] via the mirrors. The auto ID sensor [B], a photodiode, is mounted on the upper front frame. The sensor cover [C] has a hole in it to allow light to fall directly onto the sensor. Sampling starts 10 millimeters from the leading edge of the original and continued to 40 millimeters from the leading edge of original in full size mode.

The length A and B in each reproduction ratio are calculated as follows:

$$A = \frac{10\ \text{mm}}{\text{Reproduction Ratio (\%)}} \times 100 \qquad B = \frac{40\ \text{mm}}{\text{Reproduction Ratio (\%)}} \times 100$$

The photosensor circuit converts the light intensity to a voltage. The detected voltage is amplified and sent to the main PCB. The CPU stores the voltage of each sampled point in RAM. It then computes the image density of the original from the maximum sample voltage and changes the development bias accordingly. (See page 2-30 for details.) The exposure lamp voltage is constant regardless of the image density of the original. (See page 2-18 for details.)

3.7 EXPOSURE LAMP VOLTAGE CONTROL

The main board controls the exposure lamp voltage through the ac drive board. The exposure lamp voltage is based on the base lamp voltage and various correction factors. The exposure lamp data setting determines the base lamp voltage. The following table gives the approximate lamp voltage for each data setting.

Exposure Lamp Data/Voltage Reference Table

Exposure Lamp Data	Exposure Lamp Voltage (Standard)		Exposure Lamp Data	Exposure Lamp Voltage (Standard)	
	115V machine	220/240V machine		115V machine	220/240V machine
100	57.1	105.9	126	71.9	133.4
101	57.6	106.9	127	72.5	134.5
102	58.2	108.0	128	73.0	135.5
103	58.8	109.1	129	73.6	136.6
104	59.3	110.1	130	74.2	137.6
105	59.9	111.2	131	74.7	138.7
106	60.5	112.2	132	75.3	139.8
107	61.1	113.3	133	75.9	140.8
108	61.6	114.4	134	76.5	141.9
109	62.2	115.4	135	77.0	142.9
110	62.8	116.5	136	77.6	144.0
111	63.3	117.5	137	78.2	145.1
112	63.9	118.6	138	78.7	146.1
113	64.5	119.6	139	79.3	147.2
114	65.0	120.7	140	79.9	148.2
115	65.6	121.8	141	80.5	149.3
116	66.2	122.8	142	81.0	150.4
117	66.8	123.9	143	81.6	151.4
118	67.3	124.9	144	82.2	152.5
119	67.9	126.0	145	82.7	153.5
120	68.5	127.1	146	83.3	154.6
121	69.0	128.1	147	83.9	155.6
122	69.6	129.2	148	84.4	156.7
123	70.2	130.2	149	85.0	157.8
124	70.8	131.3	150	85.6	158.8
125	71.3	132.4			

NOTE: Exposure lamp rating: 100V machine: 85V/300W
115V machine: 97V/300W
220/240V machine: 180V/330W

The exposure lamp voltage consists of the following 3 factors:

Exposure lamp voltage = Base lamp voltage factor
+
Reproduction ratio correction factor
+
Drum wear correction factor

3.7.1 Base Lamp Voltage Factor In Manual Image Density Control

Darker ⟷ Lighter

Manual ID Level	1	2	3	4	5	6	7
Exposure Lamp Data	Vo –4	Vo ±0	Vo ±0	Vo ±0	Vo +4	Vo +8	Vo +12

The above table shows changes in the exposure lamp data in manual image density mode.

SP mode #48 sets the exposure lamp data for level 4 (Vo) of manual image density mode. A value from 100 to 150 can be selected.

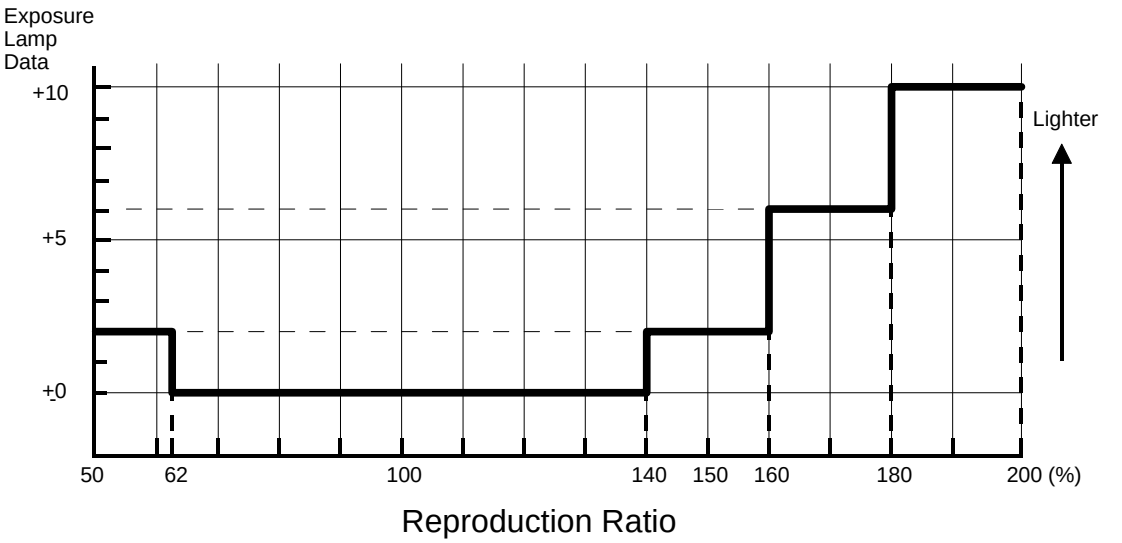
3.7.2 Base Lamp Voltage Factor In Auto Image Density Control

In auto ID mode, the CPU selects the level 4 (Vo) exposure lamp data regardless of the input from the auto image density sensor. When the auto image density level is set to lighter in SP mode #34, the exposure lamp data changes to that of manual ID level 5 as shown below. When the auto image density level is set to darker, the development bias shifts +40 volts. Only the development bias varies according to the input from the auto image density sensor. (See page 2-30).

Auto Image Density Level (SP mode #34)

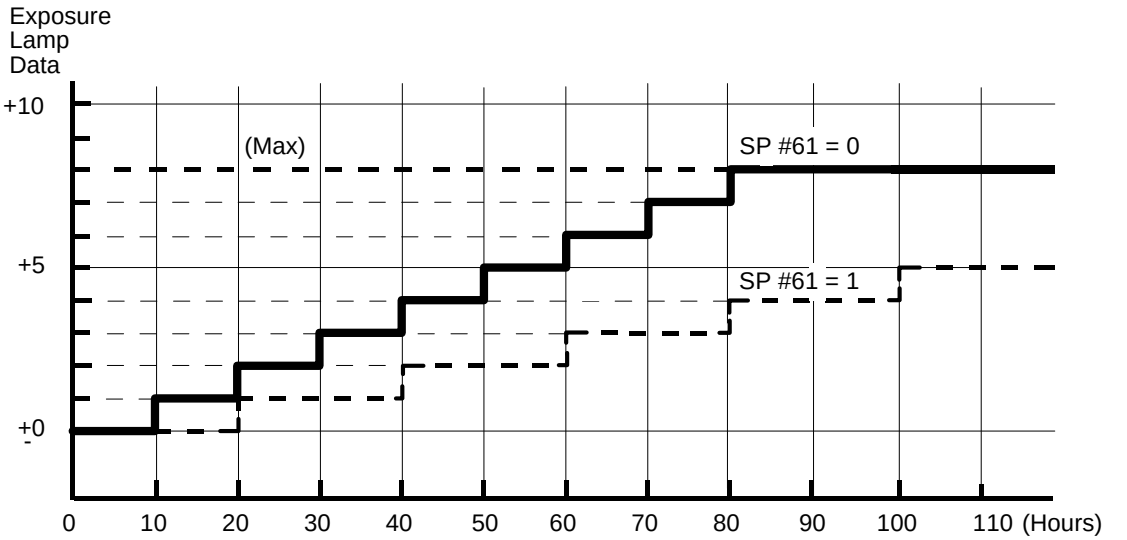
Auto Image Density Level	SP Data (SP mode #34)	Exposure Lamp Data	Development Bias Shift
Normal	0	Same as level 4 (Vo ±0)	±0 volts
Darker	1	Same as level 4 (Vo ±0)	+40 volts
Lighter	2	Same as level 5 (Vo +4)	±0 volts

3.7.3 Reproduction Ratio Correction Factor



For the reduction and enlargement reproduction ratios the light path is longer than for the full size reproduction ratio. For this reason, the exposure lamp voltage is increased when reduction or enlargement is selected. The above chart shows the exposure lamp data at various reproduction ratios.

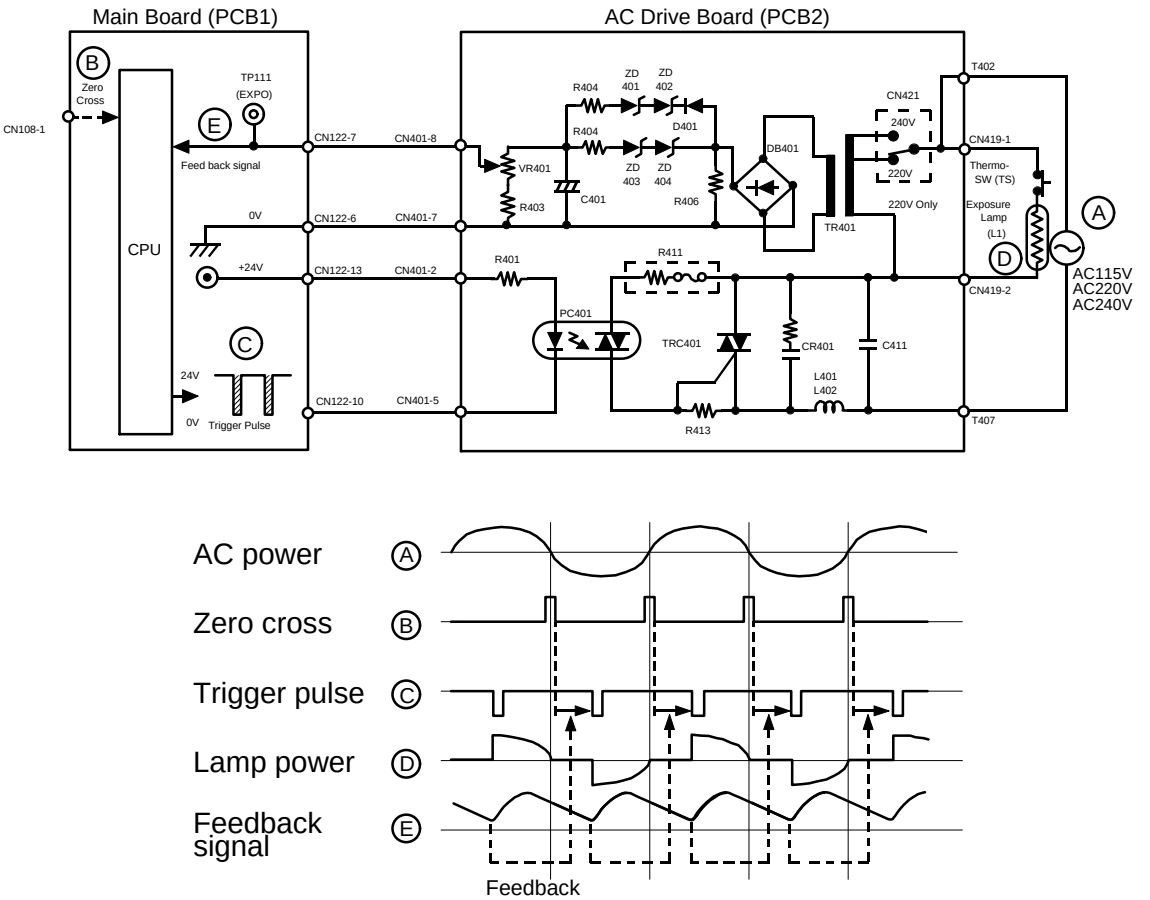
3.7.4 Drum Wear Correction Factor



Main Motor On Time

To compensate for OPC drum wear caused by contact with the cleaning brush, the exposure lamp voltage is increased at set intervals of main motor ON time. When SP mode #61 is set to 0, exposure lamp data is increased 1 at 10-hour intervals. When SP mode #61 is set to 1, the data is increased 1 at 20-hour intervals. The total increase cannot exceed 8.

3.8 EXPOSURE LAMP CONTROL CIRCUIT



The main board sends lamp trigger pulses to the ac drive board from CN122-10. PC401 activates TRC401, which provides ac power to the exposure lamp, at the trailing edge of each trigger pulse.

The voltage applied to the exposure lamp is also provided to the feedback circuit. The feedback circuit steps down (TR401), rectifies (DB401), and smoothes (zener diodes and capacitors) the lamp voltage. The CPU monitors the lowest point of the smoothed wave (feedback signal), which is directly proportional to the actual lamp voltage.

The CPU changes the timing of the trigger pulses in response to the feedback voltage. If the lamp voltage is too low, the CPU sends the trigger pulses earlier so that more ac power is applied to the exposure lamp. This feedback control is performed instantly; so, the lamp voltage is always stable even under fluctuating ac power conditions.

The voltage applied to the exposure lamp can be changed with SP mode #48 (Light Intensity Adjustment). The ADS voltage adjustment (SP mode #56) must be done whenever the light intensity adjustment is done.

3.9 SERVICE CALL CONDITIONS

Service Code 11: Exposure Lamp Error

The feedback signal becomes higher than 4.2 volts (r.m.s.) for 1.0 second when the exposure lamp is on, or it becomes higher than 1.0 volt (r.m.s) for 1.0 second when the exposure lamp is off.

Service Code 12: Exposure Lamp Error

The feedback signal falls below 0.5 volt (r.m.s.) for 1.0 second when the exposure lamp is on, or the exposure lamp stays on for longer than 10 seconds.

Service Code 13: Zero Cross Signal Error

The CPU does not receive the zero cross signal within 0.56 second.

Service Code 21: Scanner Home Position Error

The scanner home position sensor remains off (LOW) 8 seconds after the main switch is turned on.

Service Code 22: Scanner Home Position Error

The scanner home position sensor is still on (HIGH) 1.0 second after the scanner starts.

Service Code 28: Lens Home Position Error

The lens home position sensor remains off (LOW) 3.5 seconds after the lens moves to the home position.

Service Code 29: Lens Home Position Error

The lens home position sensor is still on (HIGH) 3.5 seconds after the lens leaves the home position.

Service Code 2A: 4th/5th Mirror Home Position Error

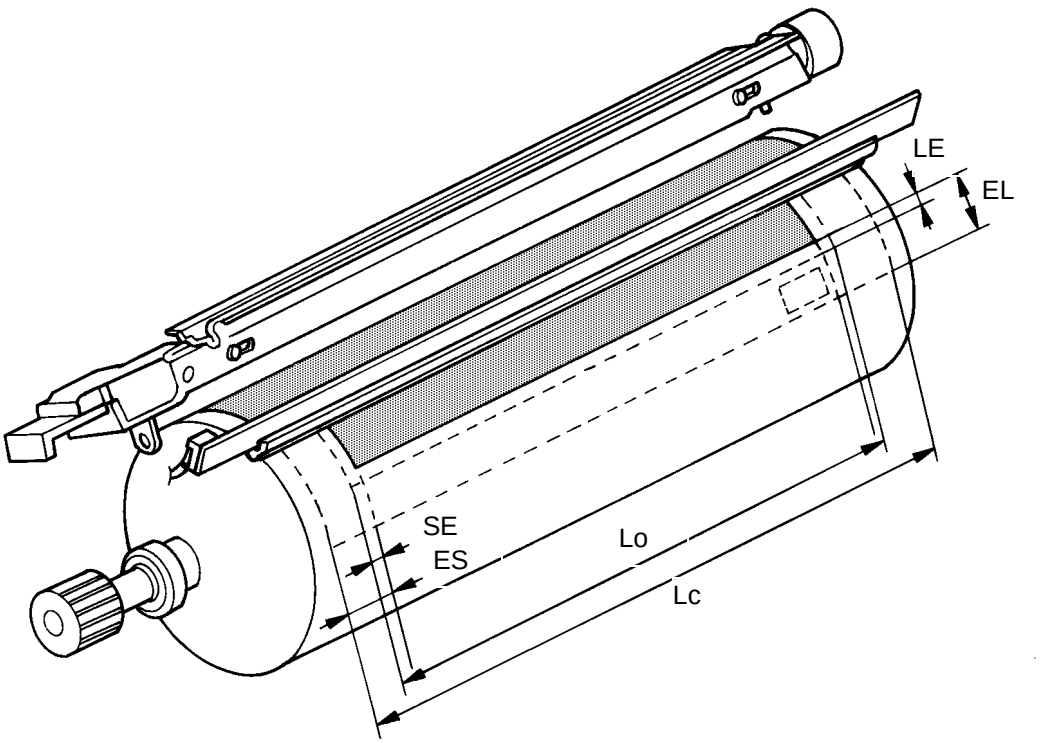
The 4th/5th mirror home position sensor is still on (HIGH) 2.5 seconds after the 4th/5th mirror assembly moves to the home position.

Service Code 2B: 4th/5th Mirror Home Position Error

The 4th/5th mirror home position sensor is still off (LOW) 2.5 seconds after the 4th/5th mirror assembly leaves the home position.

4. ERASE

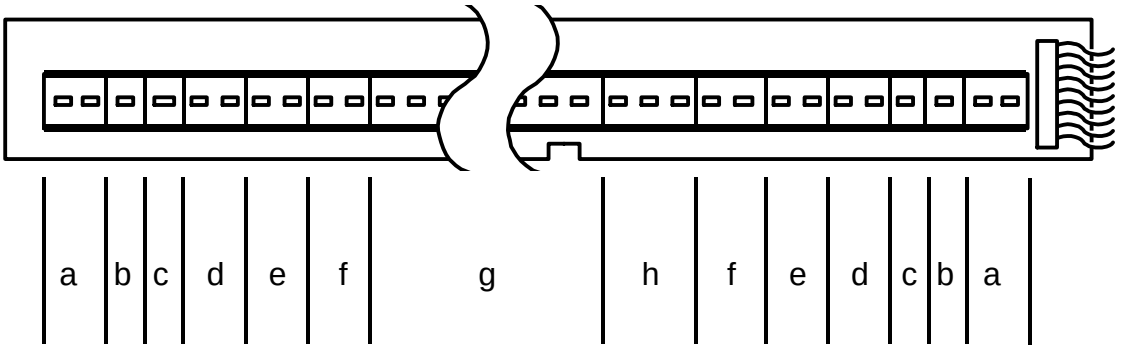
4.1 OVERVIEW



LE: Lead edge erase margin	2.5 ±1.5 mm
SE: Side erase margin	2.0 ±2.0 mm on each side; total of both sides 4 mm or less
LO: Original width	
LC: Charged width of drum	
EL: Lead edge erase	
ES: Side erase	

The erase lamp [A] consists of a line of LEDs extending across the full width of the drum [B].

The erase lamp has three functions: leading edge erase, side erase, and trail edge erase. Trail edge erase begins after the trailing edge of the copy paper; therefore, the trailing edge of the copy will not be erased.



4.1.1 Lead Edge Erase

The entire line of LEDs turns on when the main motor turns on. They stay on until the erase margin slightly overlaps the lead edge of the original image area on the drum (Lead Edge Erase Margin). This prevents the toner density sensor pattern from being developed every copy cycle and the shadow of the original edge from being developed on the paper. At this point, side erase starts. The width of the lead edge erase margin can be adjusted using SP mode #41.

During the image density detection cycle (once every ten copy cycles), a block of erase lamps (labeled "h" above) turns off long enough for the sensor pattern to be developed.

The entire line of LEDs turns on when the residual voltage on the OPC drum is being detected (Vr correction).

4.1.2 Side Erase

Based on the combination of copy paper size and the reproduction ratio data, the LEDs turn on in blocks (labeled "a" – "h" above). This reduces toner consumption and drum cleaning load.

The following table shows which erase lamp LEDs turn on.

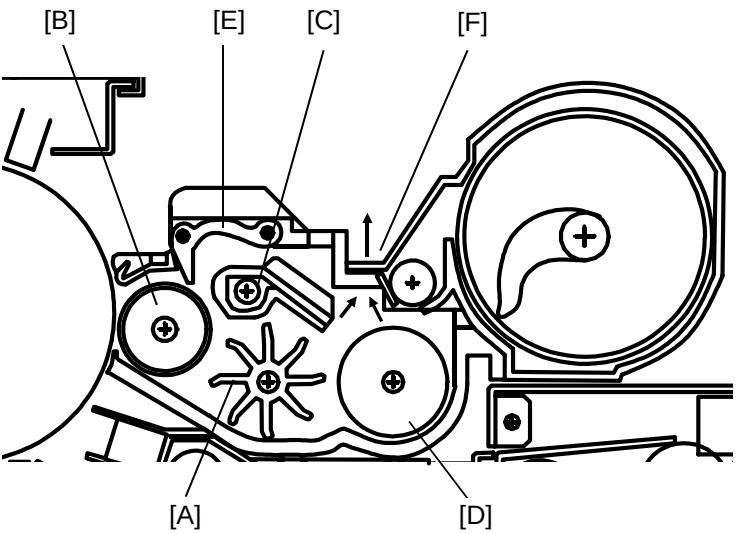
Blocks On	Paper Size	Reproduction Ratio (%)
None	A3, A4 sideways 11" x 17", 11" x 8 1/2	98 – 200
a		92 – 97
a – b	B4	86 – 91
a – c		80 – 91
a – d	8 1/2" x 11", 8 1/2" x 5 1/2" A4 lengthwise	71 – 79
a – e	B5 lengthwise	61 – 70
a – f	A5 lengthwise, 5 1/2" x 8 1/2"	50 – 60
a – f, g		For ID sensor pattern
All		For Vr correction

4.1.3 Trailing Edge Erase

The entire line of LEDs turns on again to erase the trailing edge after the latent image has passed. This prevents the trailing edge from appearing on the copy. The LEDs stay on to erase the leading edge of the latent image in the next copy cycle. After the final copy, the erase lamps turn off at the same time as the main motor.

5. DEVELOPMENT

5.1 OVERVIEW



When the main motor turns on, the paddle roller [A] development roller [B] the auger [C], and the agitator [D] start turning. The paddle roller picks up developer in its paddles and transports it to the development roller. Internal permanent magnets in the development roller attract the developer to the development roller sleeve.

The turning sleeve of the development roller then carries the developer past the doctor blade [E]. The doctor blade trims the developer to the desired thickness and creates backspill to the cross-mixing mechanism.

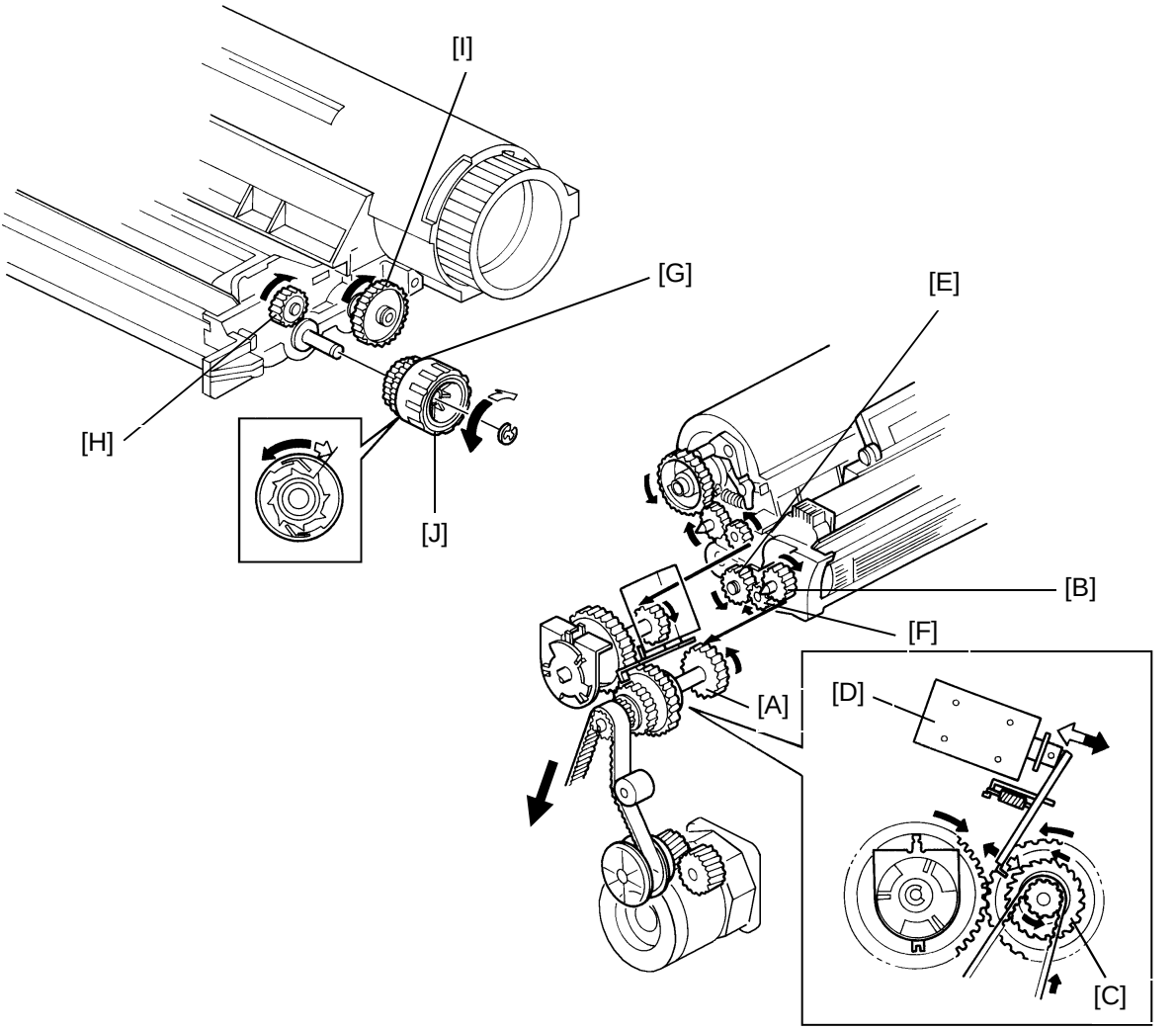
The development roller continues to turn, carrying the developer to the OPC drum. When the developer brush contacts the drum surface, the negatively charged areas of the drum surface attract and hold the positively charged toner. In this way, the latent image is developed.

The development roller is given a negative bias to prevent toner from being attracted to non-image areas on the drum that may have residual negative charge. The bias also controls image density.

After turning about 100 degrees more, the development roller releases the developer to the developer tank. The developer is agitated by the paddle roller, agitator [D], and the cross-mixing mechanism.

Rotation of the paddle roller and development roller tend to cause air pressure inside the unit to become higher than the air pressure around the development unit. A hole, fitted with a filter [F], has been added to the top of the unit to relieve air pressure and to minimize toner scattering.

5.2 DRIVE MECHANISM

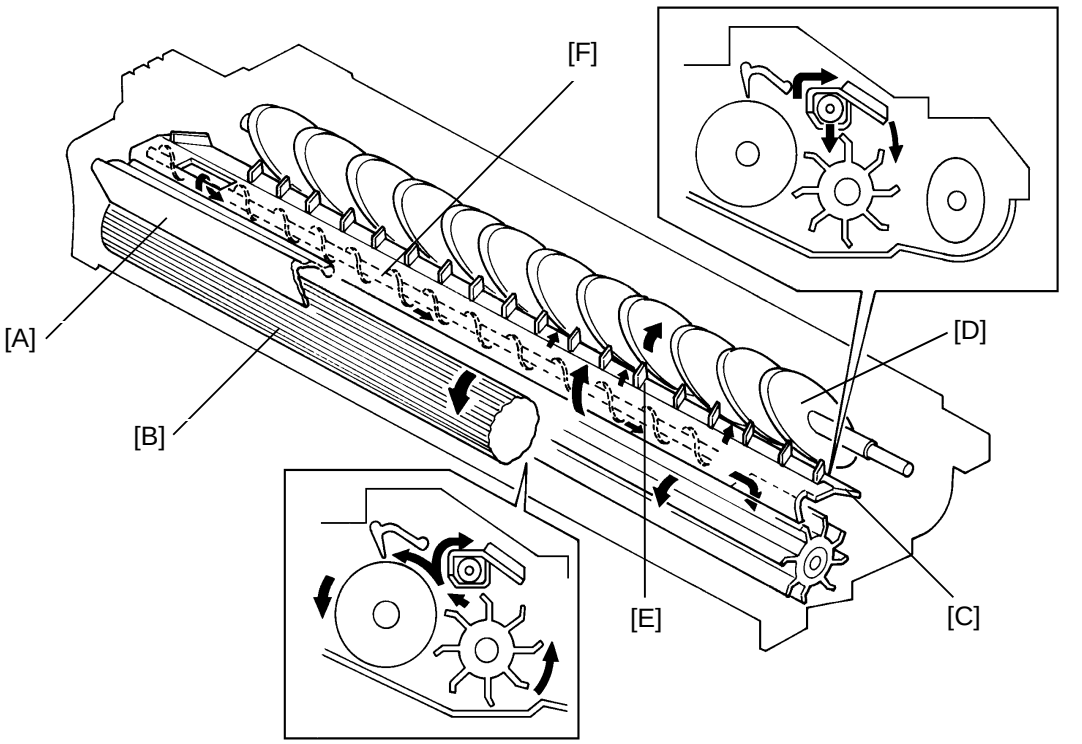


When the main motor turns, the rotation is transmitted from the development drive gear [A] to the development roller gear [B] through the development clutch [C]. (The rotation is transmitted to the development drive gear when the development solenoid [D] is de-energized.) Then, the rotation is transmitted from the development roller gear to the paddle roller gear [E] through the idle gear [F].

A gear [G] on the front end of the paddle roller shaft drives the auger gear [H] and the agitator gear [I]. The paddle roller shaft has a knob [J] on the front end so that it can be turned manually to exchange toner. The knob has a one-way clutch inside. The one-way clutch prevents the development roller from turning in the wrong direction.

The development clutch solenoid energizes each copy cycle after image development is completed. This stops the rollers, thereby reducing developer fatigue.

5.3 CROSS-MIXING



This copier uses a standard cross-mixing mechanism to keep the toner and developer evenly mixed. It also helps agitate the developer to prevent developer clumps from forming and helps create the triboelectric charge.

The developer on the turning development roller is split into two parts by the doctor blade [A]. The part that stays on the development roller [B] forms the magnetic brush and develops the latent image on the drum. The part that is trimmed off by the doctor blade goes to the backspill plate [C].

As the developer slides down the backspill plate to the agitator [D], the mixing vanes [E] move it slightly toward the rear of the unit. Part of the developer falls into the auger inlet and is transported to the front of the unit by the auger [F].

The agitator moves the developer slightly to the front as it turns, so the developer stays level in the development unit.

5.4 DEVELOPMENT BIAS FOR IMAGE DENSITY CONTROL

Image density is controlled by changing two items: (1) the strength of the bias voltage applied to the development roller sleeve, and (2) the strength of the voltage applied to the exposure lamp.

Applying a bias voltage to the development sleeve reduces the potential between the development roller and the drum, thereby reducing the amount of toner transferred. As the bias voltage becomes greater, the copy image becomes lighter. Similarly, increasing the voltage to the exposure lamp causes an increase in light intensity which also results in lighter copies.

The method of control is different depending on whether the image density is manually selected or the automatic ID mode is used.

The development bias applied to the development roller sleeve has the following three factors:

Development bias voltage = Base bias voltage factor
(Manual or automatic image density control)
+
Base bias voltage adjustment factor
+
Vr correction factor

The base bias voltage for non-image areas is –200 volts (Fixed).

5.4.1 Base Bias Voltage Factor In Manual Image Density Control

Darker ⟷ Lighter

Manual ID Level	1	2	3	4	5	6	7
Base Bias Voltage	–120	–120	–160	–200	–200	–240	–280
Exposure Lamp Data	Vo –4	Vo	Vo	Vo	Vo +4	Vo+8	Vo+12

In manual ID control mode, the base bias voltage depends on the manually selected ID level. The voltage applied at each ID level is shown in the above table. The base exposure lamp voltage also varies depending on the manual ID level as shown in the table. (See page 2-18 for more information.)

5.4.2 Base Bias Voltage Factor In Automatic Image Density Control

In automatic image density control mode, the base exposure lamp voltage is fixed to Vo. (See page 2-18 for more information.) Image density is controlled by changing only the base bias voltage.

The base bias voltage depends on the background image density of the original, which is measured using the original ID sensor. (See page 2-18 for more information.)

The CPU checks the voltage output from the automatic ID circuit. This circuit has a peak hold function. The peak hold voltage corresponds to the maximum reflectivity of the original. The CPU then determines the proper base bias level with reference to the peak hold voltage.

The following table gives the base bias voltages at each ADS output level.

When the automatic density level is set to darker by SP mode #34, the base bias voltage shifts +40 volts as shown in the following table.

K	Base Bias Voltage	
	Normal or Lighter (SP mode #34 = 0 or 2)	Darker (SP mode #34 = 1)
$K \geq TH1$	–200 volts	–160 volts
$TH1 > K \geq TH2$	–260 volts	–220 volts
$TH2 > K \geq TH3$	–320 volts	–280 volts
$TH3 > K$	–380 volts	–340 volts

$$K = \frac{\text{ADS Output Voltage (Peak Hold Voltage)}}{\text{ADS Adjusted Voltage (SP \#56)}}$$

TH1 to 3: Threshold level (See the following table.)

To maintain the correct image density, the lamp data is incremented when the reproduction ratio is changed and/or drum wear correction is done. This increment in the lamp data increases the intensity of light reflected from the original. Therefore, the ADS output voltage also changes.
In order to maintain a constant voltage for the same original when the lamp data is incremented, the threshold levels are shifted with each increment in the lamp data as shown in the following table.

Increase of lamp data	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
TH1	0.70	0.75	0.80	0.85	0.89	0.94	0.98	1.03	1.08	1.12
TH2	0.66	0.70	0.74	0.78	0.83	0.87	0.91	0.96	1.00	1.04
TH3	0.29	0.31	0.33	0.35	0.37	0.39	0.41	0.43	0.45	0.48

5.4.3 Base Bias Voltage Adjustment Factor

Base Bias Adjustment
(Black toner: SP mode #37, Color Toner: SP mode #79)

Image Density	SP Data (SP mode #37 or #79)	Change of Base Bias Voltage
Normal	0	±0 volts
Darkest	1	+40 volts
Darker	2	+20 volts
Lighter	3	–20 volts
Lightest	4	–40 volts

The base bias voltage can be changed in SP mode #37 for black toner or #79 for color toner to adjust the image density level. The above table gives the base bias voltage for each SP mode setting. This adjustment should be done only when the exposure lamp voltage adjustment (SP mode #48) fails to achieve the desired image density.

5.4.4 Vr Correction Factor

As the OPC drum is used, drum residual voltage (Vr) gradually increases. Vr correction compensates for residual voltage on the drum. Vr correction is done every 1,000 copies based on the data of the drum counter (SP mode #69) and the Vr correction ratio (L) (SP mode #67). The following chart shows how the bias voltage changes depending on the Vr correction ratio (L).

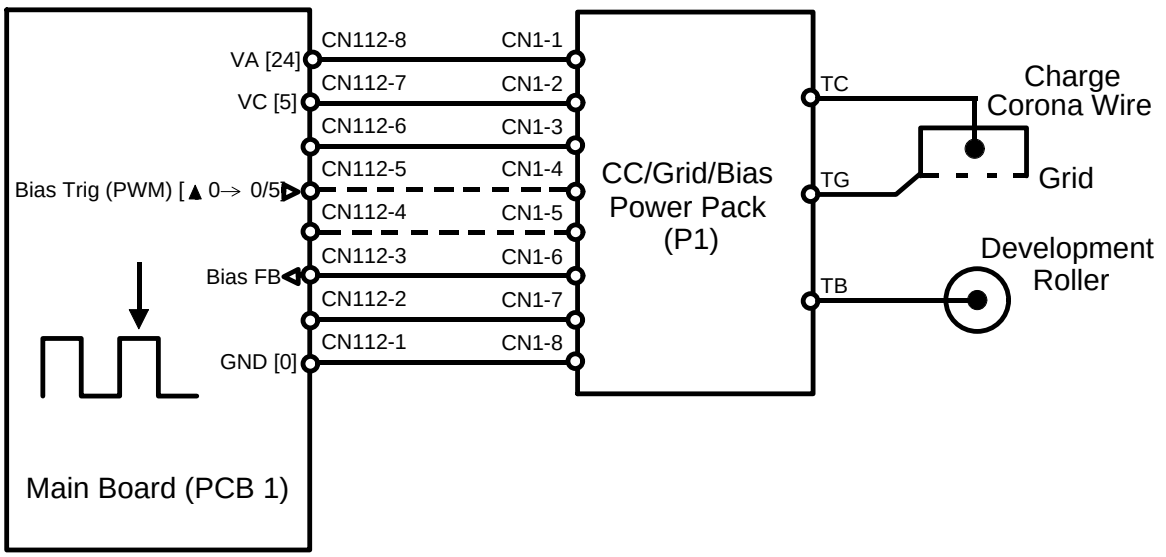
Vr Correction Factor

L	Change of Bias Voltage
100 to 89 (%)	±0 (volts)
88 to 76 (%)	–40 (volts)
75 to 62 (%)	–80 (volts)
61 to 45 (%)	–120 (volts)
44 to 0 (%)	–160 (volts)

NOTE: L = Vrp/Vsg x100 (Vr Correction Ratio)
Vrp: ID sensor output for Vr correction pattern
Vsg: ID sensor output for bare drum

When the Vr correction is made every 1,000 copies, all blocks of erase lamps turn on and the development bias becomes 0 volts to develop the Vr correction pattern.

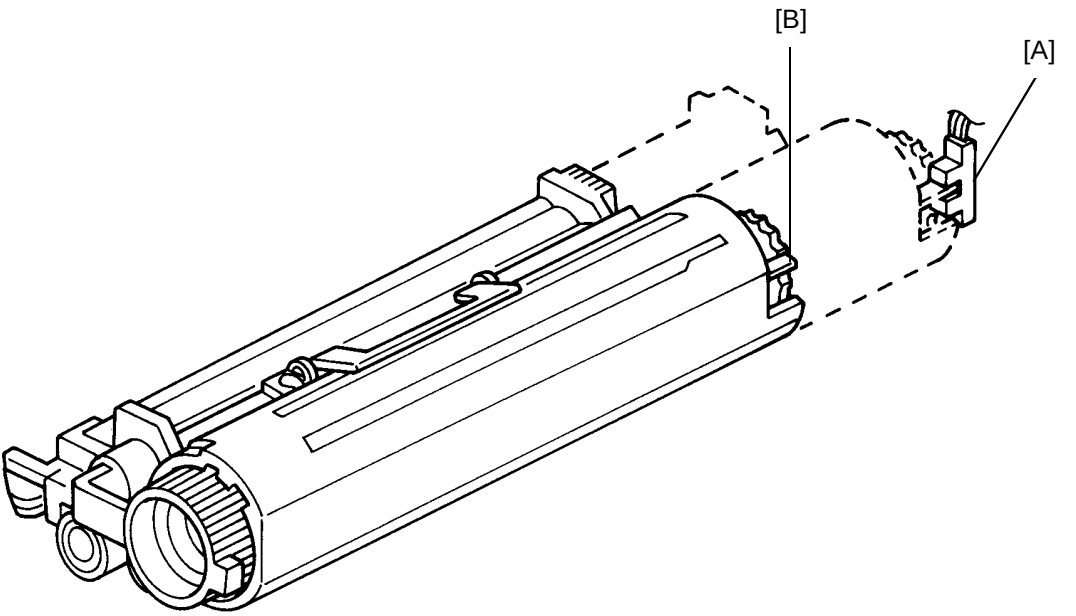
5.5 DEVELOPMENT BIAS CIRCUIT



The main board supplies +24 volts to the CC/Grid/Bias power pack at CN1-1 as the power supply source. When the Start key is pressed, the CPU starts sending the bias trigger pulse to CN1-4. This energizes the development bias circuit within the CC/Grid/Bias power pack, which applies a high negative voltage to the development roller. The development bias is applied whenever the drum is rotating except when the Vr pattern is developed.

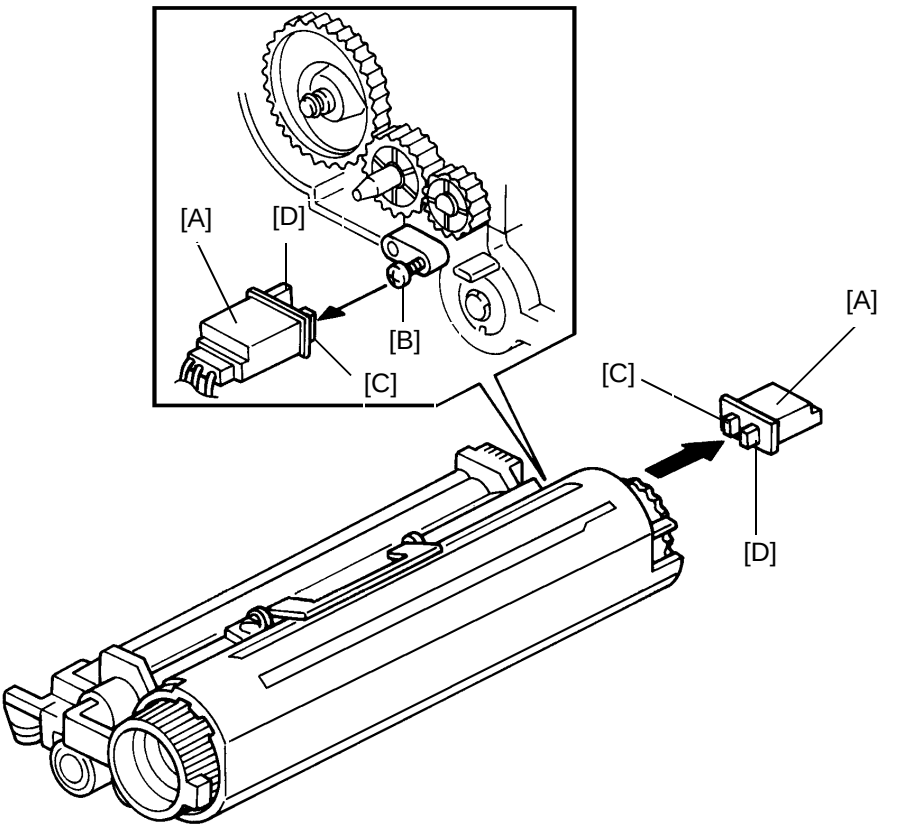
The bias trigger pulse applied to CN1-4 is a pulse width modulated signal (PWM signal). This signal is also used to change the voltage level of the development roller. As the width of the trigger pulses increase, the voltage of the development roller also increases. The CPU monitors the development bias voltage at CN1-6 and controls the width of the bias trigger pulses based on this feedback.

5.6 DEVELOPMENT UNIT SET SENSOR



When the development unit is removed from the copier, the development unit set sensor (S12) [A] sends a LOW signal to the main board and "U3" lights in the operation panel. When the development unit is properly set in the copier, the sensor is actuated by a projection [B] on the rear of the toner supply unit and "U3" turns off.

5.7 COLOR DEVELOPMENT UNIT DETECTION



Color Development Unit Detection Table

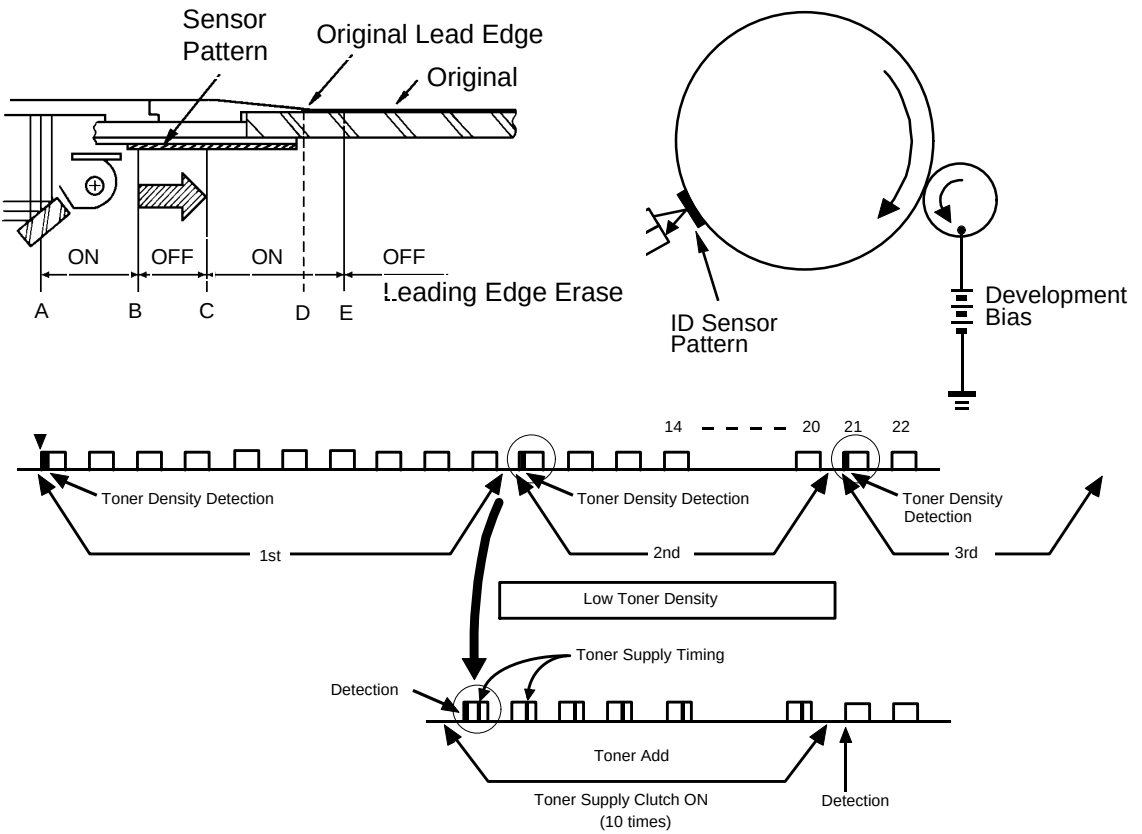
SW 8-1	SW 8-2	Color
OFF	OFF	Black
ON	OFF	Red
OFF	ON	Green
ON	ON	Blue

ON: LOW
OFF: PULSE

When a color development unit is installed in the copier, the color switch [A] is activated by screw [B] at the rear side of the development unit. The color switch has two microswitches (SW8-1 [C] and 8-2 [D]) inside. The CPU receives a LOW signal from the microswitch activated by the screw and determines which color unit has been installed.

6. TONER DENSITY DETECTION AND TONER SUPPLY

6.1 DETECT SUPPLY MODE



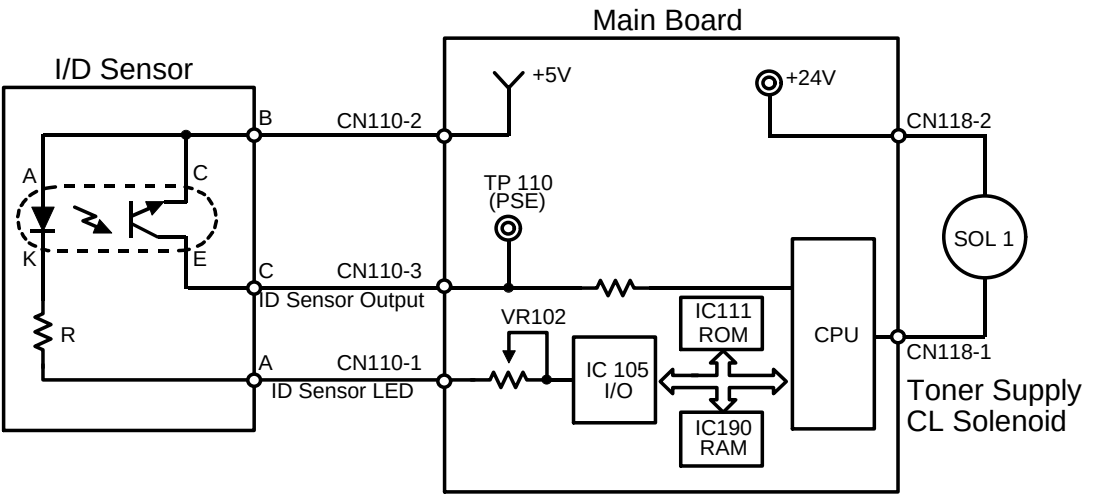
The CPU checks toner density by directly sensing the image density every 10 copy cycles (every 5 copies for the color development unit). If the RAM is cleared (SP mode #99), or a new RAM is installed, the CPU checks the image density at the beginning of the first copy cycle.

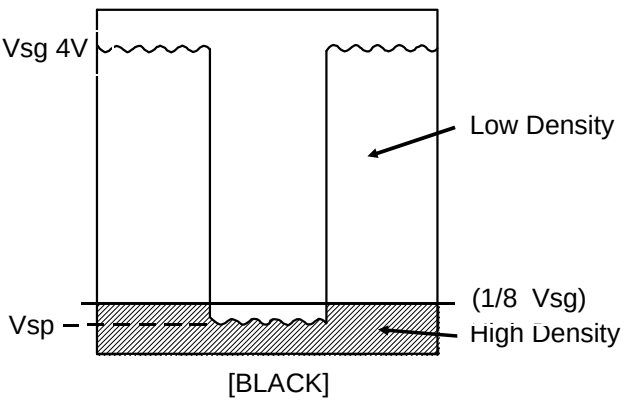
During the check cycles, the sensor pattern is exposed prior to exposure of the original. After the sensor pattern is developed, its reflectivity is checked by the image density sensor (a photosensor). The CPU notes the reflectivity. If the reflected light is too strong, indicating a too low toner density condition, toner is added to the development unit.

The toner is not added all at once. The CPU energizes the toner supply clutch solenoid for the proper amount of time to add a selected amount of toner over the next 10 cycles.

When a color development unit is used, the CPU automatically selects fixed toner supply mode.

6.2 ID SENSOR FUNCTION IN DETECT SUPPLY MODE





The image density sensor checks the density of the sensor pattern image once every 10 copy cycles. The CPU receives two voltage values directly from the sensor: the value for the bare drum (Vsg) and the value for the sensor pattern (Vsp). These two values are then compared to determine whether more toner should be added.

1. Vsp ≤1/8 Vsg .....No toner is added. (High density)
2. Vsp >1/8 Vsg .....Toner is added.(Low density)

When the image density is too low, the CPU activates the toner supply clutch solenoid to add toner over the next 10 copy cycles. The amount of toner added depends on the value of Vsp, the selected toner supply ratio (SP mode #31) and the paper size in use. (See page 2-42 for more information.)

When the data of SP mode #35 is set to "1" (factory setting = "0"), the CPU changes the interval of the ID check from every 10 copies to every 5 copies for the black development unit.

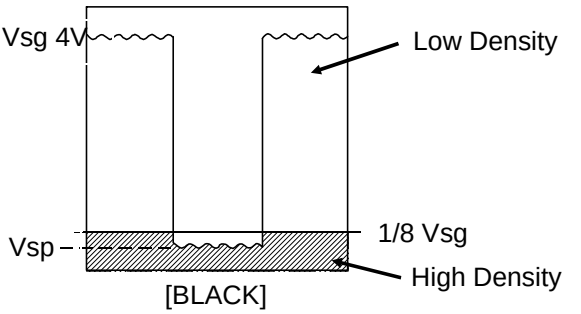
6.3 FIXED SUPPLY MODE

When the data of SP mode #30 is "1" (factory setting = "0") or a color development unit is installed, the fixed supply mode is selected. In this case, a fixed amount of toner is added every copy cycle depending on the selected toner supply ratio (SP mode #32 (black toner), SP mode #70 (color toner), the paper size in use, and the supply mode data. (See page 2-44 for more information.)

6.4 ID SENSOR FUNCTION IN FIXED SUPPLY MODE

6.4.1 Black Development Unit

In fixed supply mode, toner is supplied every copy cycle according to the fixed toner supply ratio data (SP mode), the paper size data and the color data. However, the toner supply clutch solenoid is de-energized to prevent over-toning when Vsp is lower than 1/8 Vsg.

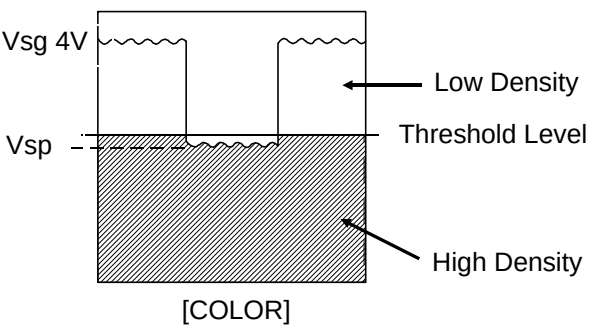


6.4.2 Color Development Unit

When a color development unit is installed, the CPU automatically selects the fixed toner supply mode. The amount of toner supplied depends on the fixed toner supply ratio (SP mode #70), the paper size data and the kind of color data.

The CPU calculates the threshold level for toner supply when the color developer initial setting (SP mode #10) procedure is completed. This level is determined by calculating the average of Vsp/Vsg x 100 (%).

Since the fixed supply mode is selected when in color toner mode, it is necessary to inhibit toner supply if the toner density becomes high to prevent over-toning. The CPU checks Vsp once every 5 copy cycles. If Vsp becomes lower than the threshold level, the CPU stops supplying toner. Toner supply resumes when Vsp rises above the threshold level again.



The threshold level (a percentage) for each color can be monitored in SP mode #80 (Red), #81 (Green) and #82 (Blue).

6.5 ABNORMAL CONDITION IN TONER DENSITY DETECTION

If the Vsg goes below 2.5 volts (Vsg abnormal) or Vsp goes above 2.5 volts (Vsp abnormal) 5 times in a row, the CPU determines that toner density detection is abnormal. The CPU changes from the detect supply mode to the fixed supply mode. At the same time either the Auto ID indicator or the selected manual ID level starts blinking, and the machine can be operated.

Abnormal Condition In Toner Density Detection

SP mode #55 Display		Conditions
Vsp	Vsg	
varies	0.00	Vsg ≤ 2.5 (Vsg Abnormal)
varies	5.00	Vsp ≥ 2.5 (Vsp Abnormal)

6.6 DEVELOPMENT BIAS FOR ID SENSOR

The development bias for the ID sensor consists of the following 2 factors:

Development bias voltage = Toner density adjustment factor
+
Vd correction factor

The development voltage for the Vr correction is 0 volts.

6.6.1 Toner Density Adjustment Factor

Toner Density Adjustment
(Black Toner: SP Mode #33, Color Toner: SP Mode #75)

Toner Density	SP Data (SP mode #33 or #75)	Development Bias Voltage			
		Black Toner	Red Toner	Blue Toner	Green Toner
Normal	0	–260 volts	–240 volts	–300 volts	–320 volts
Low	1	–220 volts	–200 volts	–260 volts	–280 volts
High	2	–280 volts	–260 volts	–320 volts	–340 volts
Higher	3	–300 volts	–280 volts	–340 volts	–360 volts
Developer Initial Setting		–340 volts	–280 volts	–240 volts	–240 volts

The development bias can be adjusted by SP mode #33 for black toner or #75 for color toner to adjust the toner density level. The above chart shows the development bias voltage corresponding to setting of SP #33 or #75. This adjustment should be used only when the exposure lamp voltage adjustment (SP mode #48) can not achieve the desired image density.

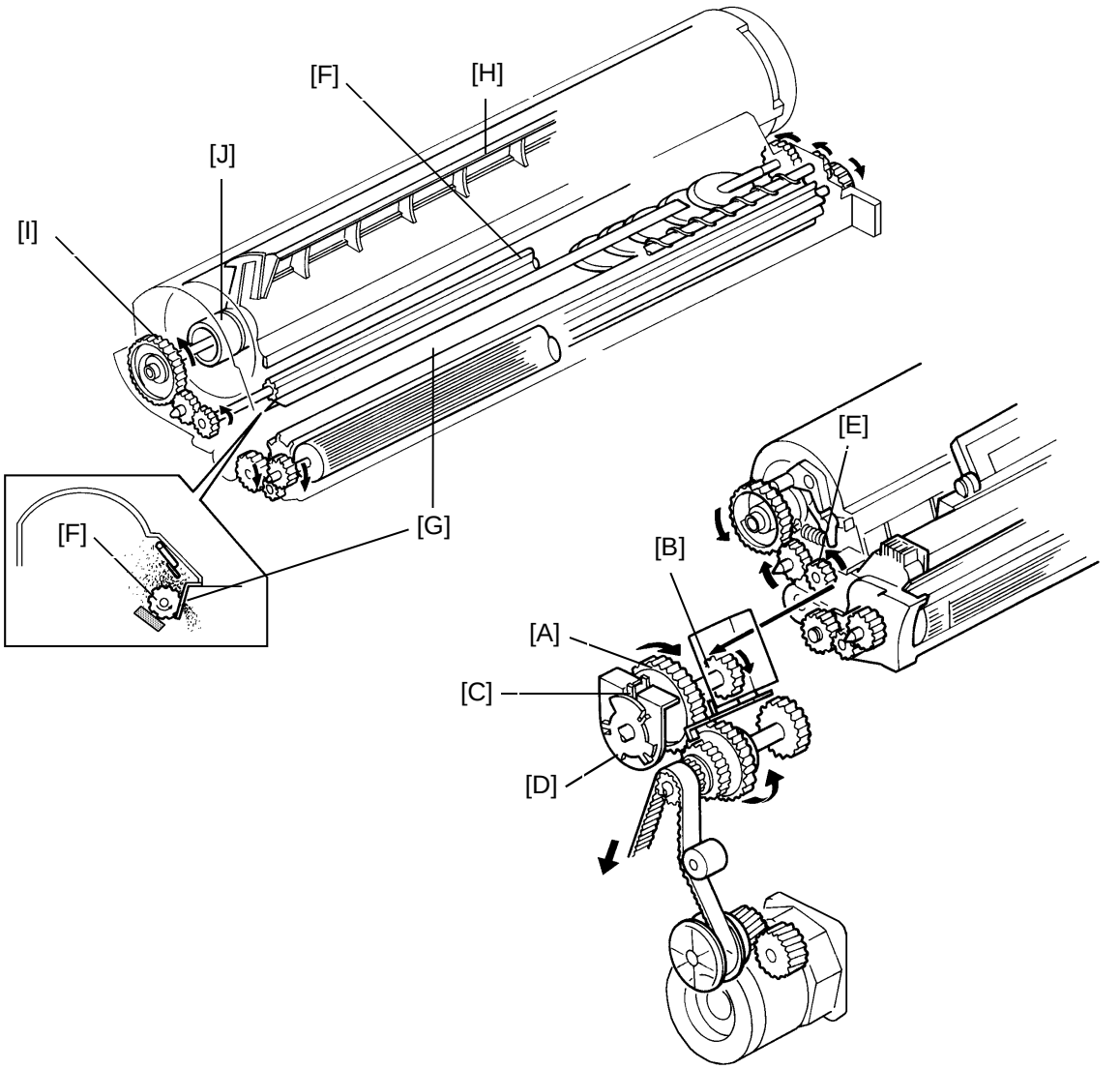
6.6.2 Vd Correction Factor (Only For Black Toner)

After developer is replaced, the triboelectric charge sometimes changes as the new developer mixture is not stabilized in during the first 500 copies. The development bias for the ID sensor is adjusted automatically to compensate for these changes.

The CPU calculates the threshold level for the Vd correction when the black developer initial setting procedure (SP mode #65) is completed. This threshold level is the average of Vsp/Vsg x 100 (%). The result of the calculation can be monitored by SP mode #64. The CPU has a software counter to count number of copies made with the developer. The counter resets to "0" when SP mode #65 is performed. The Vd correction is made based on the data of the counter and of SP mode #64. The following table gives the threshold levels for each data value of SP#64.

SP Data (SP mode #64)	Vsp/Vsg x100 (%)	Change of Development Bias Voltage	
		0 to 499 copies	More than 500 copies
0	12 to 15	±0 volts	±0 volts
1	0 to 7	–40 volts	±0 volts
2	8 to 11	–20 volts	±0 volts
3	16 to 21	±0 volts	+20 volts
4	More than 22	±0 volts	+40 volts

6.7 TONER SUPPLY AND AGITATOR DRIVE MECHANISM



The toner supply clutch gear [A] turns when the main motor is on. The transmission of this rotation to the toner supply drive gear [B] is controlled by the toner supply clutch [C].

When the toner supply clutch solenoid [D] energizes, the toner supply clutch engages and starts turning the toner supply drive gear. The toner supply drive gear turns the toner supply roller gear [E]. Toner catches in the grooves on the toner supply roller [F]. Then, as the grooves turn past the pin hole plate [G], the toner drops into the development unit through the pin holes.

The toner agitator [H] mechanism, which is contained in the toner cartridge, prevents toner from blocking. The toner agitator gear [I] turns whenever the toner supply clutch solenoid is engaged. Rotation passes through the toner cartridge casing to the agitator junction [J].

6.8 TONER SUPPLY AMOUNT

This copier has two different ways of controlling the amount of toner supplied. Normally, the detect supply mode controls toner supply for the black development unit; however, a fixed supply mode also can be selected by SP mode #30. When the color development unit is installed, the fixed supply mode controls toner supply regardless of the setting of SP mode #30.

6.8.1 Detect Supply Mode (SP mode #30 = 0)

The amount of toner supplied depends on the ID sensor data, the detect toner supply ratio data, and the paper size. The toner supply clutch solenoid on time in each copy cycle is calculated as follows:

Toner Supply Clutch Solenoid ON Time = I x T x P (pulses)

Where : I = ID Sensor Data
T = Detect Toner Supply Ratio Data
P = Paper Size Data

For example: Vsp = 0.65 volts, which means the toner supply level is "2" and the ID sensor = 29.

The data of SP mode #31 is set to "0".
The toner supply ratio is 15 % and the toner supply data = 2.

Paper size is A4 or LT.
The paper size data = 1.

Toner Supply Clutch ON Time = I x T x P
= 29 x 2 x 1
= 58 (pulses)
= 232 (m sec.) (1 pulse = 4.0 m sec.)

ID Sensor Data

Vsp/Vsg x100 (Vsp, if Vsg = 4.0 volts)	Toner Supply Level (Toner Supply Ratio, if SP #31 = 0)	ID Sensor Data
0 to 12.5 % (0 to 0.5 volts)	No toner supply (0 %)	0
12.5 to 15.0 % (0.5 to 0.6 volts)	1 (3.75 %)	15
15.0 to 17.5 % (0.6 to 0.7 volts)	2 (7.5 %)	29
17.5 to 25.0 % (0.7 to 1.0 volts)	3 (15 %)	59
25.0 to 62.5 % (1.0 to 2.5 volts) (See note below.)	4 (30 %)	118
62.5 to more than 100 % (2.5 to 5.0 volts)	Fixed supply mode	N/A

NOTE: If this condition is detected two times consecutively, the toner supply ratio rises to 60% (ID Sensor Data = 236), which is double that at toner supply level 4.

Detect Toner Supply Ratio Data (SP mode #31)

SP Data (SP mode #31)	Toner Supply Ratio	Toner Supply Ratio Data
0	15 %	2
1	7 %	1
2	30 %	4
3	60 %	8

Paper Size Data

Paper Size	Paper Size Data
Paper Size ≤ A4 or LT	1
Paper Size > A4 or LT	2

6.8.2 Fixed Supply Mode (SP mode #30 = 1)

The amount of toner supplied depends on the fixed toner supply ratio data, the paper size data and the color data. The toner supply clutch solenoid on time in each copy cycle is calculated as follows:

Toner Supply Clutch Solenoid ON Time = T x P x 2 x C (pulses)

Where: T = Fixed Toner Supply Ratio Data
P = Paper Size Data
C = Color Data

For example: The data of SP mode #32 is set to "0".
The toner supply ratio is 7.0% and the toner supply data = 2.

Paper size is A4. The paper size data = 29.
Black toner is used. The color data = 1.

Toner Supply Clutch ON Time = T x P x 2 x C
= 2 x 29 x 2 x 1
=116 (pulses)
= 464 (m sec.) (1 pulse = 4.0 m sec.)

Fixed Toner Supply Ratio Data (Black Toner: SP mode #32)

SP Data (SP mode #32)	Toner Supply Ratio	Toner Supply Ratio Data
0	7.0 %	2
1	3.5 %	1
2	10.5 %	3
3	14.0 %	4

Fixed Toner Supply Ratio Data (Color Toner : SP mode #70)

SP Data (SP mode #70)	Toner Supply Ratio	Toner Supply Ratio Data
0	14.0 %	2
1	7 .0%	1
2	21.0 %	3
3	28.0 %	4

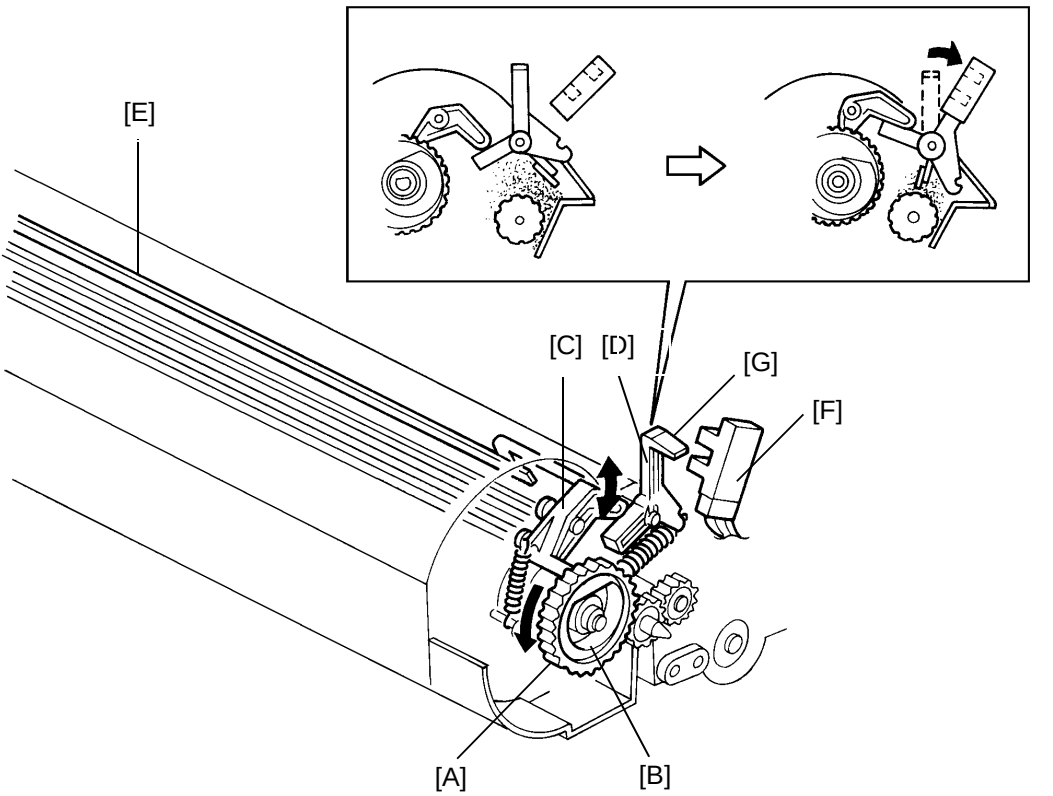
Paper Size Data

Paper Size	Paper Size Data
A3	58
B4	43
A4	29
B5	23
A5	15
B6	11
11" X 17"	55
8 1/2" X 14"	37
8 1/2" X 11"	27
5 1/2" X 8 1/2"	14
Universal (*)	29
Paper size not detected	0

Color Data

Color	Color Data
Black	1
Red	2
Blue or Green	1.2

6.9 TONER END DETECTION



The toner agitator gear [A] has a cam [B] (the toner end cam) on its inner surface, and it rotates only when toner is supplied. The cam follower on the end of the toner end lever [C] rides on the surface of the toner end cam (spring pressure). The opposite end of the toner end lever alternately presses and releases the toner end arm [D] as the cam turns. The toner end plate [E], which is in the toner hopper, is mounted on the same shaft as the toner end arm.

When there is sufficient toner in the hopper, the toner end plate is prevented from moving by the toner. Therefore, even when the toner end lever drops to the lowest position on the cam (releasing the toner end arm), the toner end arm does not move and the toner end sensor [F] is not activated.

When there is insufficient toner in the hopper, the toner end plate can move. When the toner end lever releases the toner end arm, the toner end plate lowers and the actuator [G] on the toner end arm moves into the toner end sensor. The CPU receives a single pulse from the toner end sensor.

If this condition is detected by the CPU two times consecutively, the Add Toner indicator starts blinking.

After the indicator starts blinking, 50 copies can be made. If a new toner cartridge is not added within that 50 copy interval, the Add Toner indicator stops blinking (stays on) and copying is inhibited. If the main switch is turned off and on after this, only 1 copy can be made each time.

The toner end condition is normally detected by the mechanism described here. However, it can also be detected using the ID sensor. The Add Toner indicator will start blinking in the following cases:

Black Development Unit: If Vsp exceeds 1/4 Vsg 10 times in a row.

Color Development Unit: If Vsp/Vsg exceeds 1.1 x threshold level 10 times in a row. The threshold level is the average of Vsp x Vsg, which is calculated and stored in RAM when the color developer initial setting (SP mode #10) procedure is completed.

When Vsp exceeds 1/4 Vsg in the black development unit, the CPU checks toner density every 5 copy cycles instead of every 10 copy cycles.

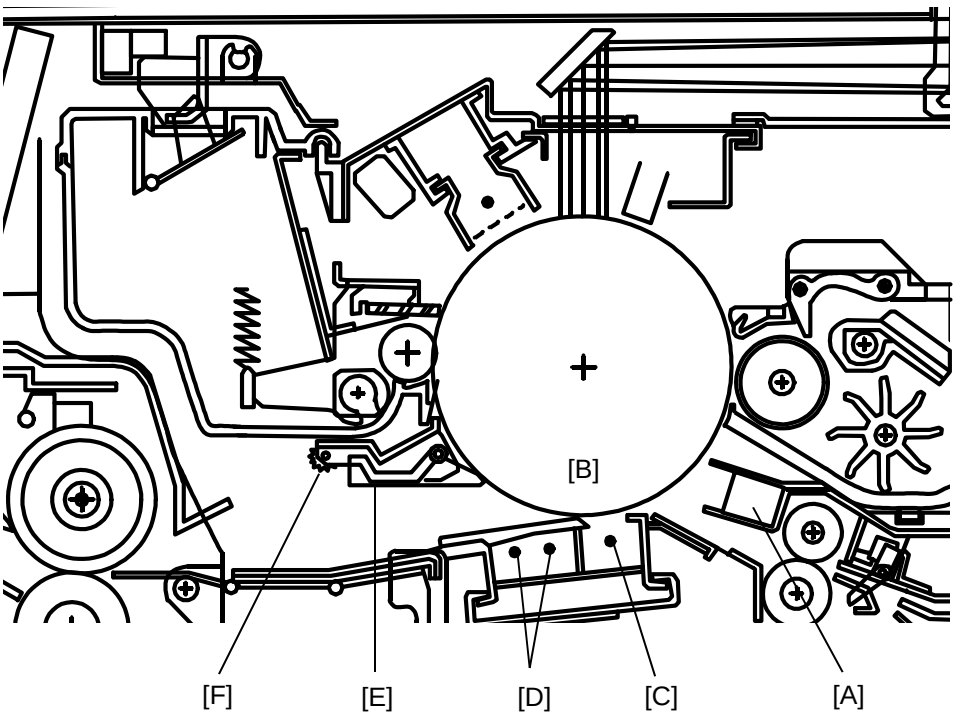
When the toner cartridge is replaced and the front cover is closed, the CPU turns on the main motor, the development clutch solenoid, and the toner supply clutch solenoid for approximately 3 seconds to supply toner to the empty toner supply unit from the toner cartridge. A toner end check is also done during this 3 second period. The CPU performs this operation a maximum of 3 times (9 seconds) to clear the toner end condition.

6.10 TONER SUPPLY UNIT INITIAL SETTING (SP mode #63)

When a brand-new machine is installed or the toner supply unit is replaced with a new one, the toner supply unit initial setting (SP mode #63) must be performed to prevent the CPU from falsely detecting toner end.

When SP mode #63 is performed, the CPU turns on the main motor, the development clutch solenoid, and the toner supply clutch solenoid for approximately 3 seconds to supply toner to the empty toner supply unit from the toner cartridge. A toner end check is also done during this 3 second period. The CPU performs this operation a maximum of 3 times (9 seconds) to clear the toner end condition.

7. IMAGE TRANSFER AND PAPER SEPARATION



7.1 PRE-TRANSFER LAMP (PTL)

After the latent image is developed but before the image is transferred to the copy paper, the drum surface is illuminated by the pre-transfer lamp [A]. This illumination reduces the negative potential on the drum surface [B]. This prevents the toner particles from being re-attracted to the negatively charged drum during the paper separation process. It also makes image transfer and paper separation easier.

7.2 IMAGE TRANSFER

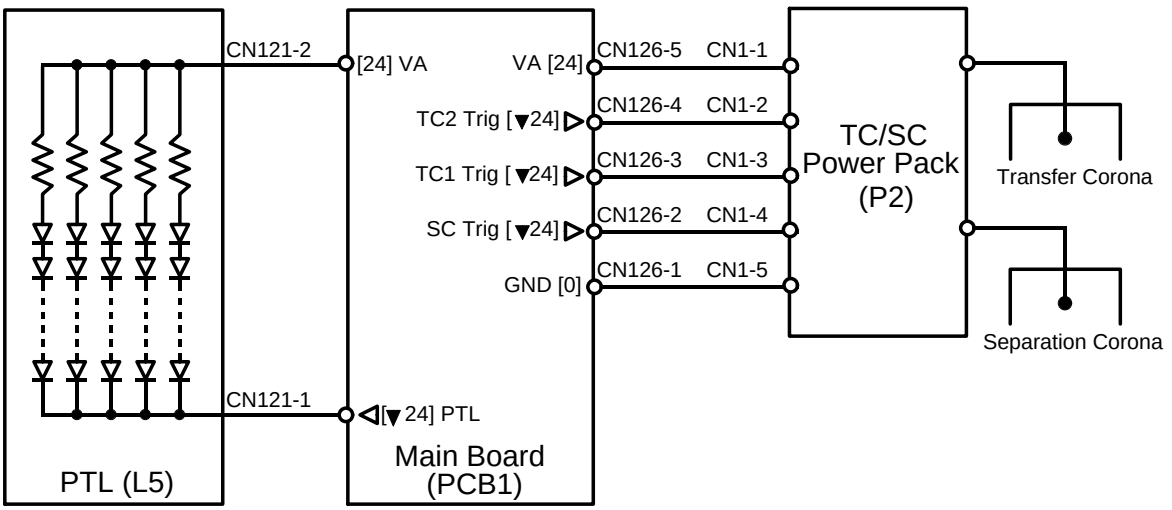
A high negative voltage (–4.8 kilovolts) is applied to the transfer corona wire [C], and the corona wire generates negative ions. These negative ions are applied to the copy paper, and the negative charge attracts the positively charged toner away from the drum and onto the paper. In addition, the paper is held against the drum by the positive counter charge on the drum.

7.3 PAPER SEPARATION

After image transfer the copy must be separated from the drum. To break the attraction between the paper and the drum, the separation corona wire [D] applies an ac corona to the reverse side of the paper. The stiffness and weight of the paper causes it to separate from the drum.

The negative charge on the paper (from the transfer corona) is not completely discharged until the paper is far enough from the drum that the toner will not be reattracted to the drum. The two pick-off pawls [E] ensure that thin, low stiffness paper and upward curled paper separate completely. The spurs [F] prevents the unfused toner on the paper from being smeared by the pick-off pawls.

7.4 PRE-TRANSFER LAMP AND TRANSFER/SEPARATION CORONA CIRCUIT



When the Start key is pressed, the main board outputs Low signals to turn on the pre-transfer lamp (PTL) and the TC/SC power pack for the transfer and separation coronas.

The pre-transfer lamp is composed of 50 LEDs supplied by +24 volts.

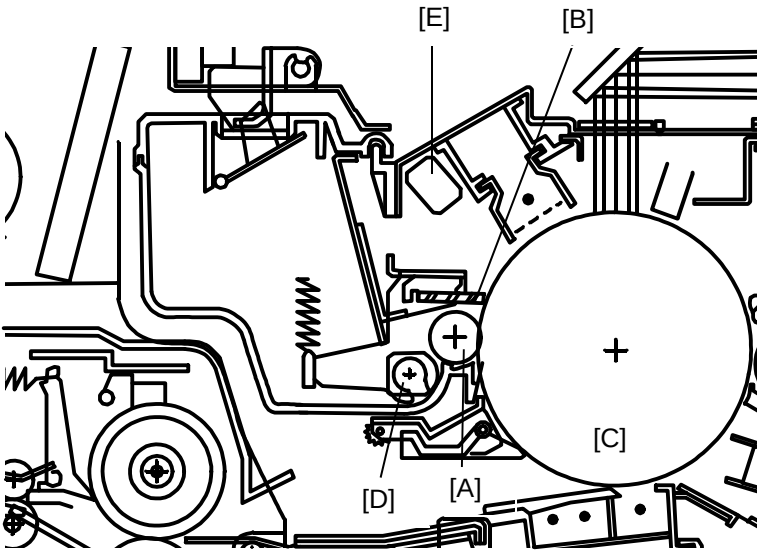
The TC/SC power pack has a dc to dc converter and a dc to ac inverter. The dc to dc converter changes +24 volts to -4.8 kilovolts for the transfer corona. The inverter changes +24 volts to the 5.0 kilovolts ac (500 Hz) for the separation corona.

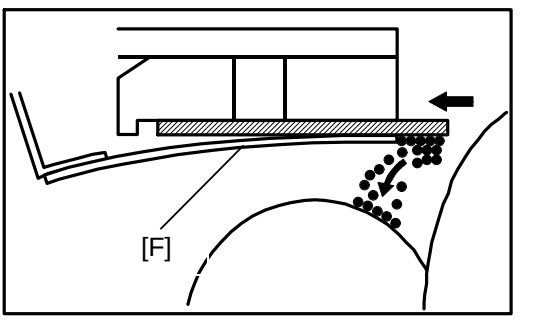
The TC2 trigger is only used for the second side copies in duplex copy mode. This shifts the corona current to increase transfer efficiency.

The separation corona circuit in the TC/SC power pack has a current leak detection circuit for safety. When this circuit detects that more than 2 milliampere is supplied to the separation corona, the separation corona turns off immediately. When the main switch is turned off and on, or the front cover or the exit cover is opened and closed, this condition is cleared.

8. DRUM CLEANING

8.1 OVERVIEW





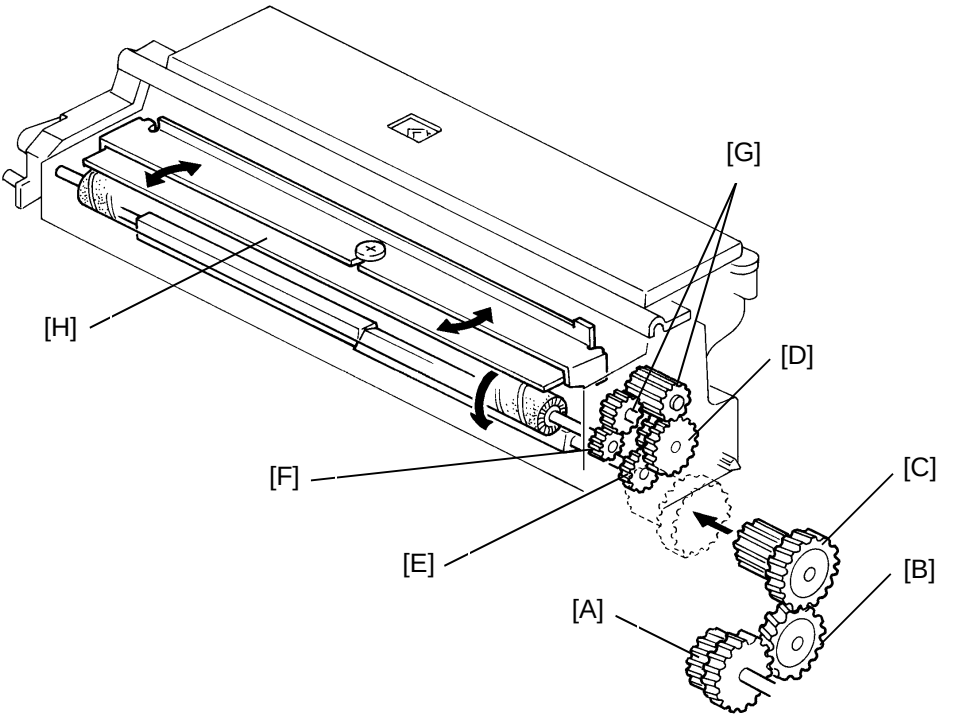
The cleaning brush [A] and cleaning blade [B] remove any toner remaining on the drum [C] after the image is transferred to the paper.

The cleaning brush and drum move in opposite directions at their point of contact. The cleaning brush removes paper dust and nearly half of the toner from the drum surface to reduce the cleaning load placed on the blade.

The cleaning blade removes the remaining toner. The falling toner catches in the fibers of the cleaning brush and is carried inside the cleaning unit. The toner collection roller [D] carries the used toner to the used toner tank. The light of the quenching lamp [E] neutralizes any charge remaining on the drum in preparation for the next copy cycle.

The cleaning blade releases when the release knob is pressed. This cleans the edge of the cleaning blade using the blade scraper [F], which is mounted under the cleaning blade.

8.2 DRIVE MECHANISM

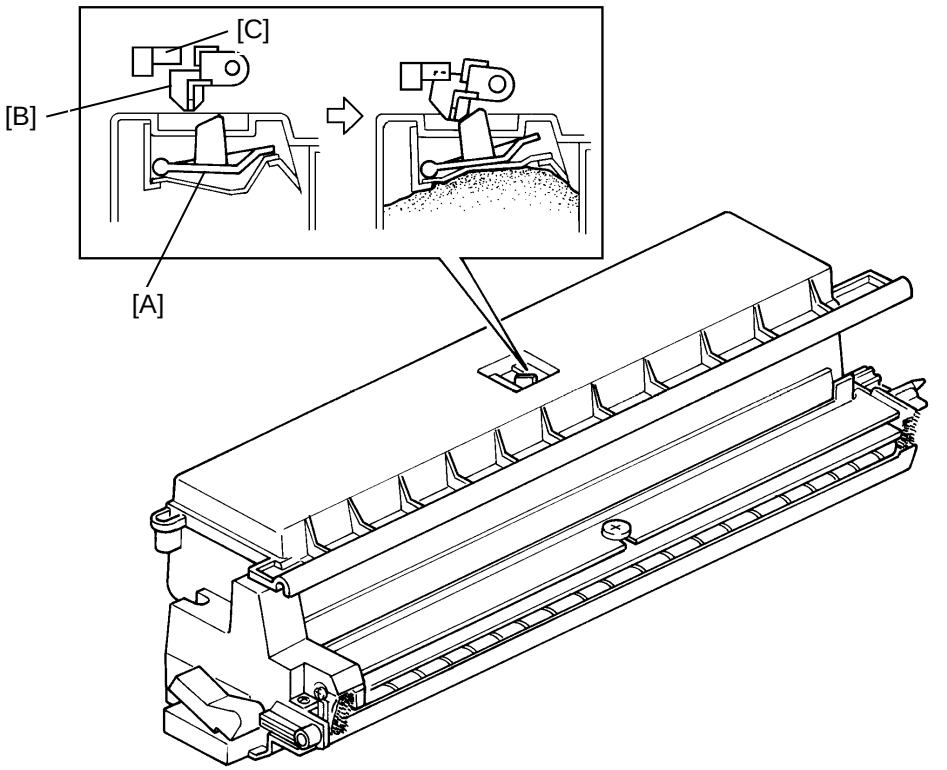


The rotation of the main motor is transmitted to the cleaning unit through the main motor gear [A], the relay gear [B], and the cleaning drive gear [C].

The gear [D] driven by the cleaning drive gear passes the rotation to the toner collection roller gear [E] and to the cleaning brush gear [F] through the idle gears [G].

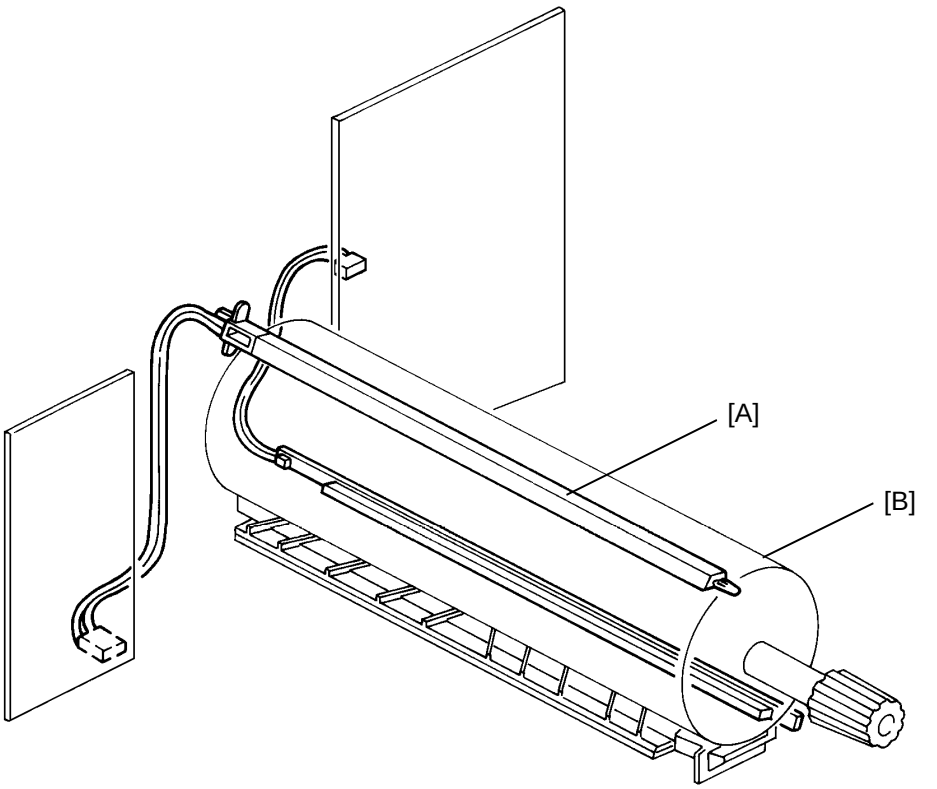
The cleaning blade [H] is mounted in the center of the blade and is tilted to apply even pressure.

8.3 TONER OVERFLOW DETECTION



The toner overflow detection mechanism stops copier operation when the used toner tank gets full. When the tank gets full, the pressure of the used toner pushes up a movable plate [A] mounted in the top of the used toner tank. As this plate moves up, it raises the toner overflow actuator [B]. When the actuator moves into the toner overflow sensor [C], the CPU starts to blink "E70" on the operation panel. After the "E70" starts to blink, 250 copies can be made. Then, after 250 copies the "E70" stops blinking (stays on) and copying is inhibited.

9. QUENCHING

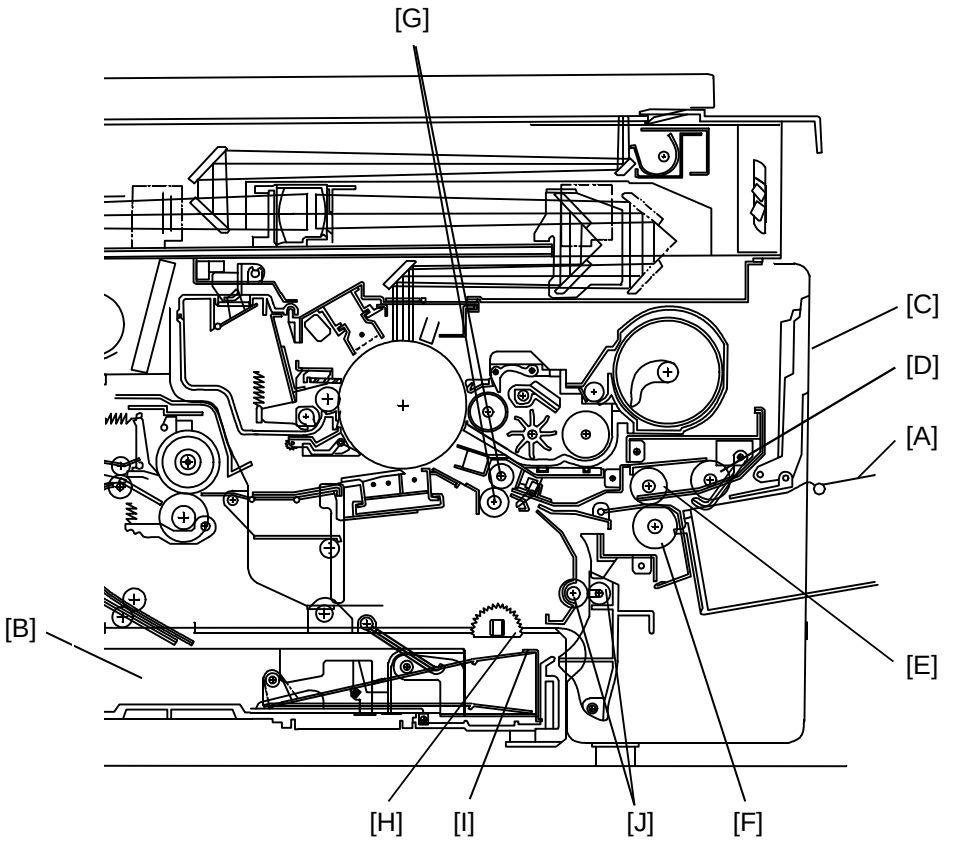


In preparation for the next copy cycle, light from the quenching lamp (QL) [A] neutralizes any charge remaining on the drum [B].

The neon lamp is used for quenching and it is turned on whenever the main motor rotates.

10. PAPER FEED AND REGISTRATION

10.1 OVERVIEW

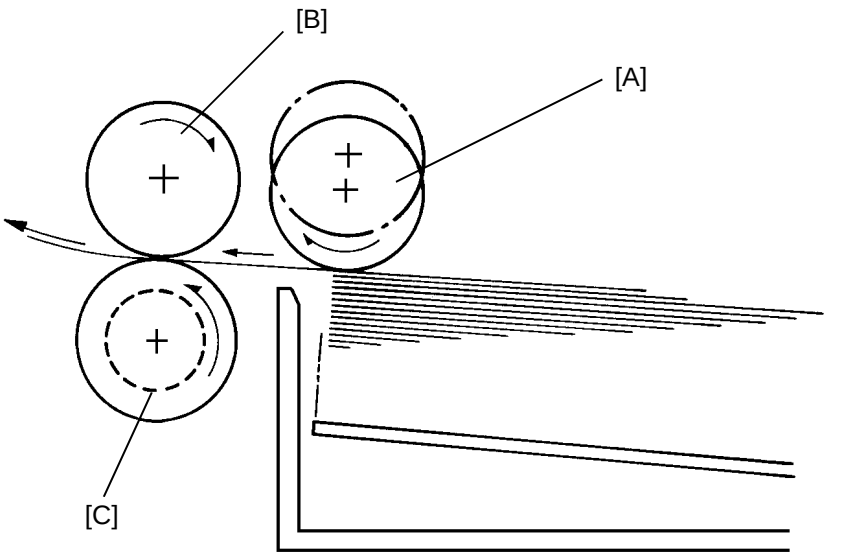


This model has two paper feed stations. The first feed station is located on the right side of the copier and the second feed station is located inside the copier. The first feed station uses a cassette [A] which can load 500 sheets, and the second feed station uses a drawer type tray [B] which can load 250 sheets. Paper can also be fed using the manual feed table [C], which utilizes the feed mechanism of the first feed station.

The first feed station uses a FRR feed system. Rotation of the pick-up roller [D] drives the top sheet of paper from the cassette to the feed and the reverse rollers. The feed [E] and reverse [F] rollers then take over the paper drive. If more than one sheet is fed by the pick-up roller, the reverse roller rotates in the opposite direction and prevents all but the top sheet from passing through to the registration rollers [G].

The second feed station uses the semicircular feed roller [H] and corner separator [I] system. The semicircular feed roller makes one rotation to drive the top sheet of paper to the relay rollers [J], which then feed the sheet to the registration rollers. The corner separator allows only one sheet to feed.

10.2 FRR FEED SYSTEM



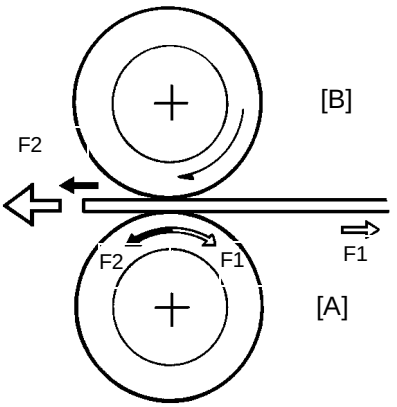
This copier uses an FRR (Feed + Reverse Roller) paper feed system which utilizes three rollers.

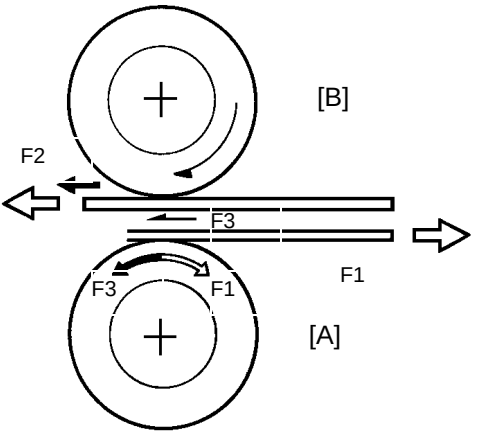
10.2.1 Pick-up Roller

The pick-up roller [A] is not in contact with the paper stack before it starts feeding paper. Shortly after the Start key is pressed, the pick-up roller drops down and feeds the top sheet between the feed [B] and the reverse rollers [C]. At almost the same time that the paper's leading edge arrives at the feed roller, the pick-up roller lifts off the paper stack so that it does not interfere with the operation of the feed and reverse rollers. The feed and reverse rollers then take over the paper feed process.

10.2.2 Feed and Reverse Rollers

There is a one-way bearing inside the feed roller so it can turn only in one direction. The reverse roller is driven in the opposite direction to the feed roller. The reverse roller, however, is driven through a slip clutch (torque limiter clutch) which allows it to turn in either direction depending on the friction between the rollers. A spring keeps the reverse roller in contact with the feed roller.

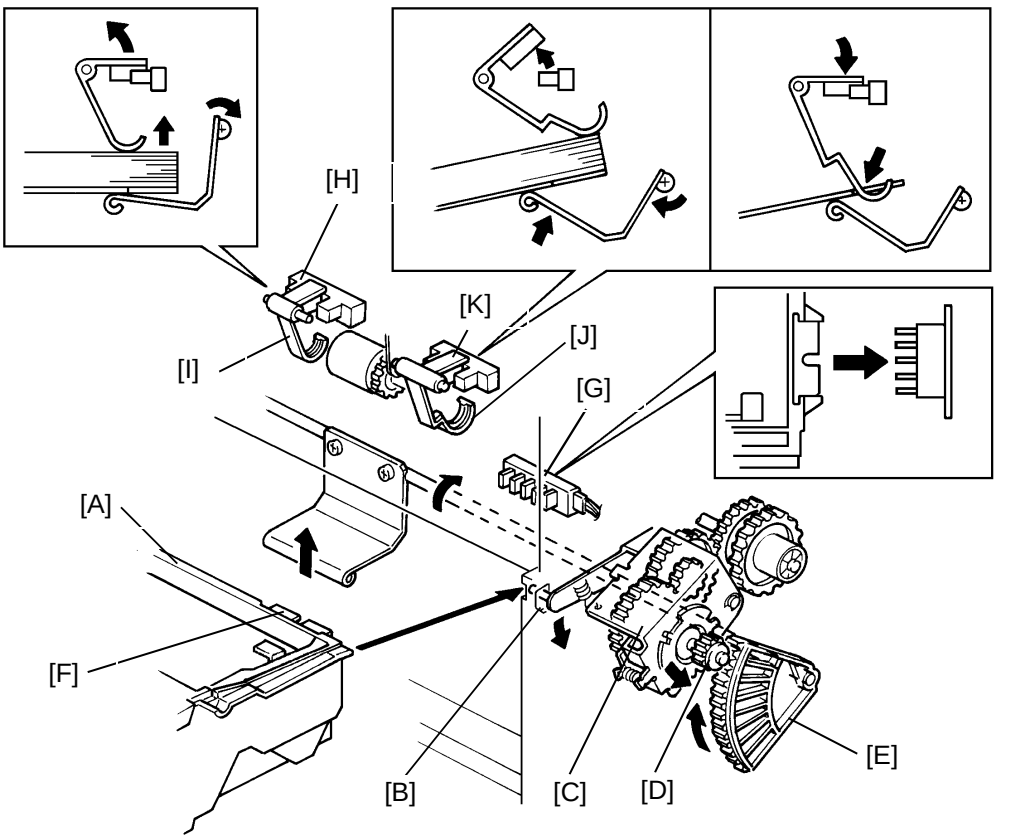




The direction that the reverse roller [A] turns depends on the frictional forces acting on it. The slip clutch applies a constant clockwise force (F1). When there is a single sheet of paper being driven between the rollers, the force of friction between the feed roller [B] and the paper (F2) is greater then F1. So, the reverse roller turns counterclockwise.

If two or more sheets are fed between the rollers, the forward force on the second sheet (F3), becomes less than F1 because the coefficient of friction between the two sheets is small. So, the reverse roller starts turning clockwise and drives the second sheet back to the cassette.

10.3 1ST FEED STATION PAPER LIFT MECHANISM AND PAPER END DETECTION



10.3.1 Paper Lift Mechanism

When the cassette [A] is inserted into the copier, the cassette actuator pin [B] is pushed down by the cassette. The paper lift clutch unit [C] moves down and then the paper lift gear [D] engages with the sector gear [E]. Simultaneously, the paper size actuator [F] actuates the paper size switch [G].

Under the following conditions, the CPU checks the paper lift sensor [H] to see if the paper is at the feed position:

1. When the Start key is pressed.
2. When the warm-up condition changes to the ready condition.
3. When the manual feed table is closed.

If the paper has not been raised to the feed position, the CPU turns on the main motor and the paper lift clutch. The paper lift gear turns the sector gear and the bottom plate raises until the top sheet pushes up the paper lift sensor feeler [I]. When the paper lift sensor is de-actuated, the paper lift sensor sends a Low signal to the main board, and then the main motor and the paper lift clutch are turned off.

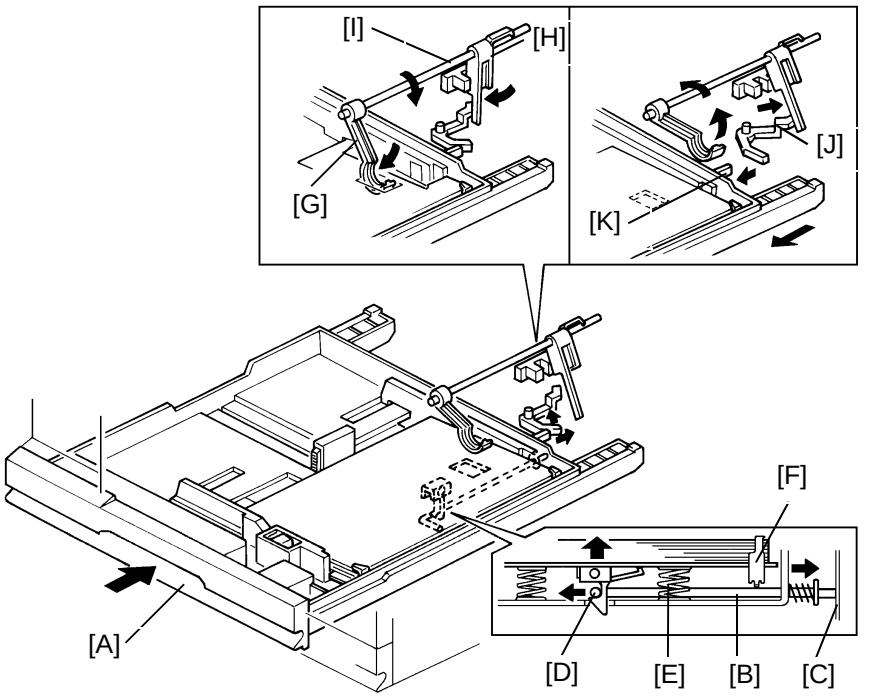
If the tray lift sensor stays HIGH for 7 seconds after the paper lift clutch is turned on, "U5" lights in the operation panel.

As paper is fed into the copier, the level of paper stack gets lower. If the level becomes too low, the paper lift sensor is actuated and the CPU energizes the paper lift clutch until the top sheet raises the feeler to de-actuate the paper lift sensor again. This ensures that the paper is always at the correct feed height.

10.3.2 Paper End Detection

When the cassette runs out of paper, the paper end feeler [J] drops through a slot in the cassette bottom plate. As it drops, the paper end sensor [K] is actuated by the feeler. The paper end sensor then sends a HIGH signal to the main board. The Add Paper indicator then turns on. The Wait indicator keeps turning on and the machine stops after the copy cycle is finished.

10.4 2ND FEED STATION PAPER LIFT MECHANISM AND PAPER END DETECTION



10.4.1 Paper Lift Mechanism

When the paper tray [A] is closed after the paper is loaded, the release shaft [B] is pushed by the rear frame [C] and releases the lock arm [D], which is mounted on the paper tray bottom plate.

Once the lock arm is released, the bottom plate is raised by the pressure spring [E] and the top sheet pushes up the corner separator [F] and stops at the correct feed height.

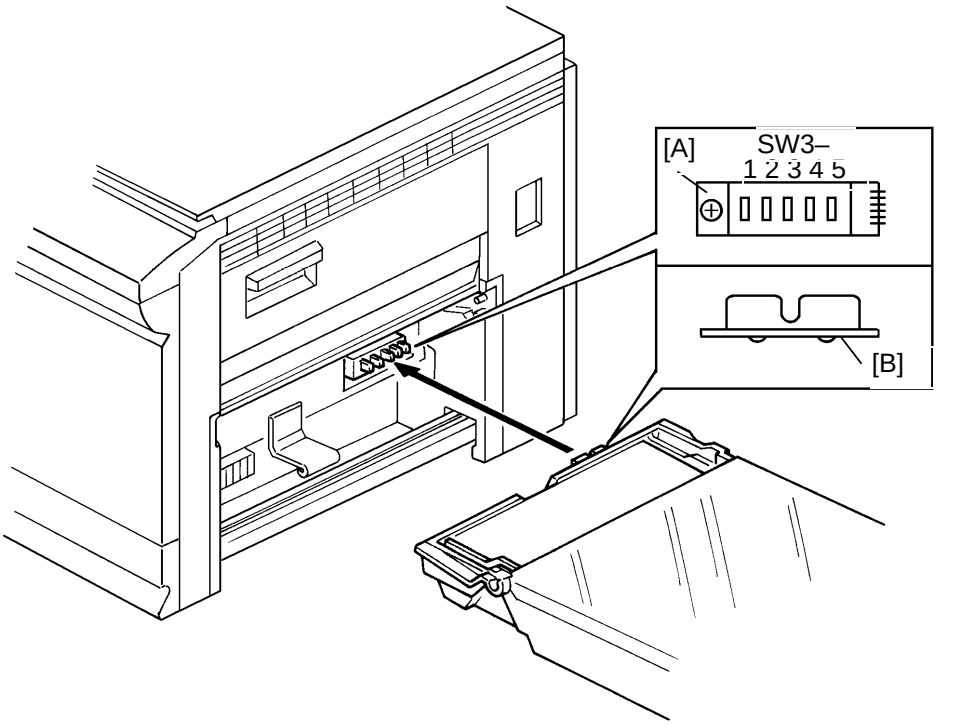
10.4.2 Paper End Detection

When the paper tray runs out paper, the paper end feeler [G] drops through a slot in the tray bottom plate. The paper end actuator [H], which is on the same shaft as the paper end feeler, pivots into the paper end sensor [I]. The paper end sensor sends a HIGH signal to the main board and then the Add Paper indicator turns on. The Wait indicator keeps turning on and the machine stops after the copy cycle is finished.

When the paper tray is pulled out, the release arm [J], which is spring loaded, rotates clockwise and lifts the paper end actuator and the paper end feeler. This prevents the paper end feeler from being damaged by the paper tray. When the paper tray is closed, the projection [K] on the paper tray pushes the release arm to release the paper end actuator and the paper end feeler.

10.5 PAPER SIZE DETECTION

10.5.1 1st Feed Station



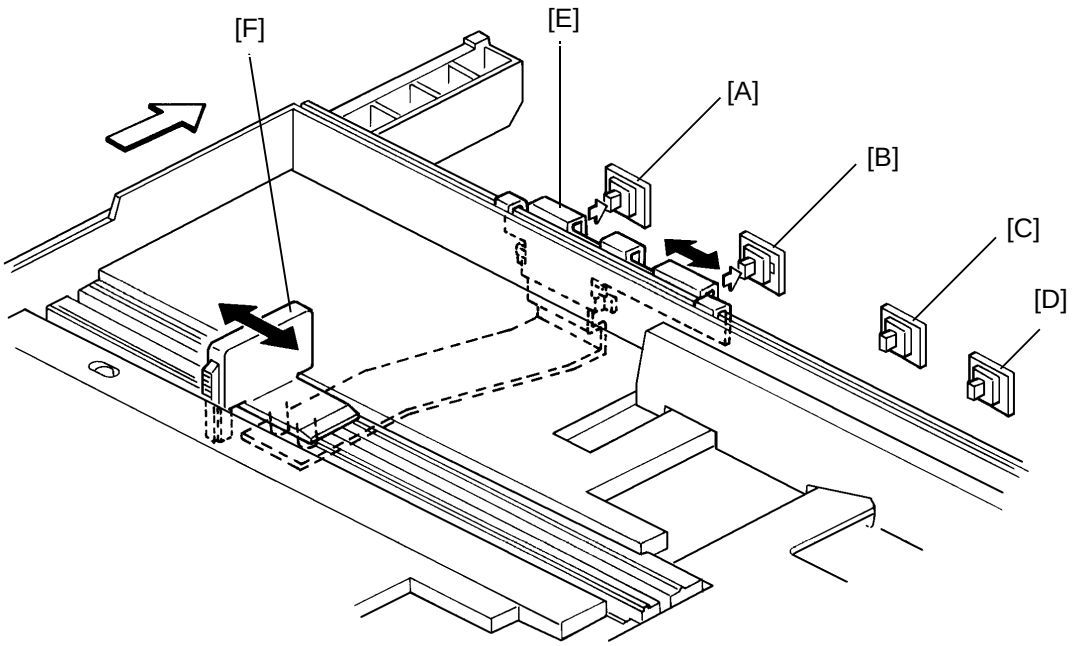
The paper size switch (SW3) [A] in the cassette entrance detects the paper size. The paper size switch has five microswitches (SW3-1 through 3-5) inside. The paper size switch is actuated by an actuator plate [B] on the rear of the cassette. Each paper size has its own unique combination of notches in the plate. The CPU receives a LOW signal from the microswitches activated by the actuator and determines which cassette was inserted.

Paper Size Detection Table (1st Feed Station)

Paper Size	Switch 3 – 1	2	3	4	5	Size Indication
Universal	0	0	0	0	0	*
A3	1	0	0	0	0	A3
B4	1	1	0	0	0	B4
A4	0	0	1	0	0	A4
A4	1	0	1	0	0	A4
B5	0	1	1	0	0	*
B5 (lengthwise)	1	1	1	0	0	*
A5 (sideways)	0	0	0	1	0	A5
A5 (lengthwise)	1	0	0	1	0	A5
B6 (sideways)	0	1	0	1	0	*
B6 (lengthwise)	1	1	0	1	0	*
Return Post Card	0	0	1	1	0	*
Post Card	1	0	1	1	0	*
11" x 17"	0	0	0	0	1	11 x 17
11" x 8 1/2"	1	0	0	0	1	8 1/2 x 11
11" x 15"	0	1	0	0	1	*
10" x 14"	1	1	0	0	1	*
8 1/2" x 14"	0	0	1	0	1	8 1/2 x 14
8 1/2" x 13"	1	0	1	0	1	*
8 1/2" x 11"	0	1	1	0	1	8 1/2 x 11
8 1/2" x 5 1/2"	1	1	1	0	1	5 1/2 x 8 1/2
8 1/4" x 13" (14")	0	0	0	1	1	*
F (8" x 13")	1	0	0	1	1	F
8" x 10 1/2"	0	1	0	1	1	*
8" x 10"	1	1	0	1	1	*
5 1/2" x 8 1/2"	0	0	1	1	1	5 1/2 x 8 1/2
No Cassette	1	1	1	1	1	

0: Low (ON)
1: High (OFF)

10.5.2 2nd Feed Station



Four paper size switches (SW4 [A], SW5 [B], SW6 [C], and SW7 [D]) on the rear frame detect the paper size. The paper size switches are actuated by an actuator plate [E] on the rear of the paper tray. The paper end guide [F] is connected to the actuator plate. When the paper end guide is pushed against the paper stack loaded in the cassette, the actuator plate slides into position and actuates the appropriate paper size switch.

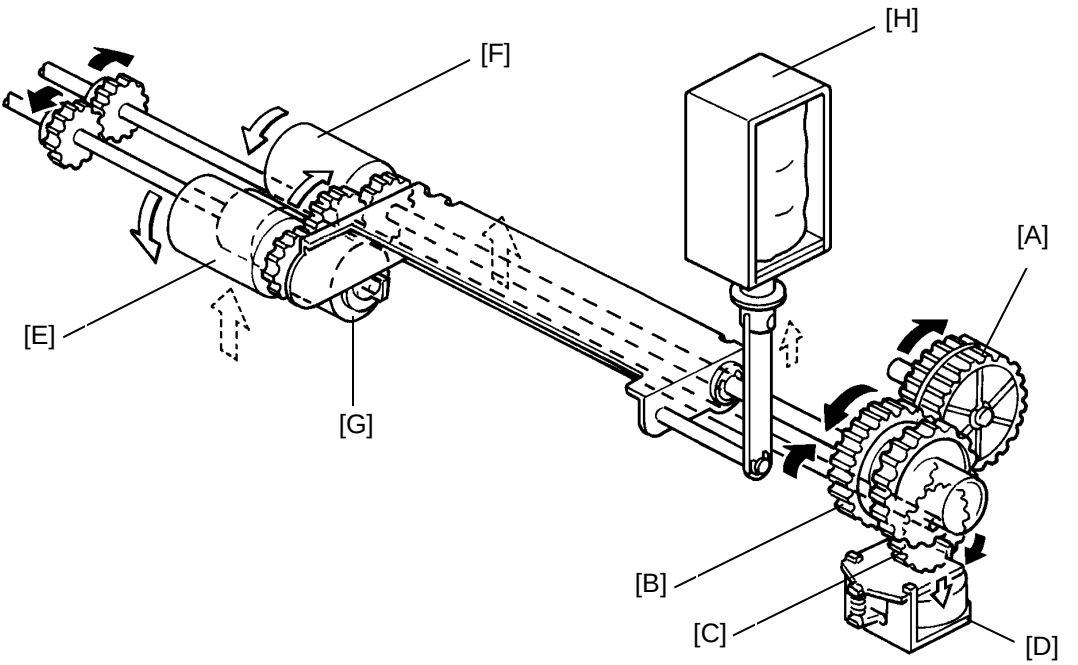
Paper Size Detection Table (2nd Feed Station)

Paper Size	Switch 4	5	6	7	Size Indication
A3	0	1	1	1	A3
F (8" x 13")	1	0	1	1	F
A4 lengthwise	1	0	0	1	A4
A4 sideways	1	1	0	1	A4
B4	0	0	1	1	B4
11" x 17"	0	1	1	1	11" x 17"
11" x 8 1/2"	1	1	1	0	8 1/2" x 11"
8 1/2" x 11"	1	1	0	1	8 1/2" x 11"
8 1/2" x 14"	1	0	1	1	8 1/2" x 14"
	0	0	0	0	Duplex Unit

0: Low (ON)
1: High (OFF)

10.6 PAPER FEED DRIVE MECHANISM

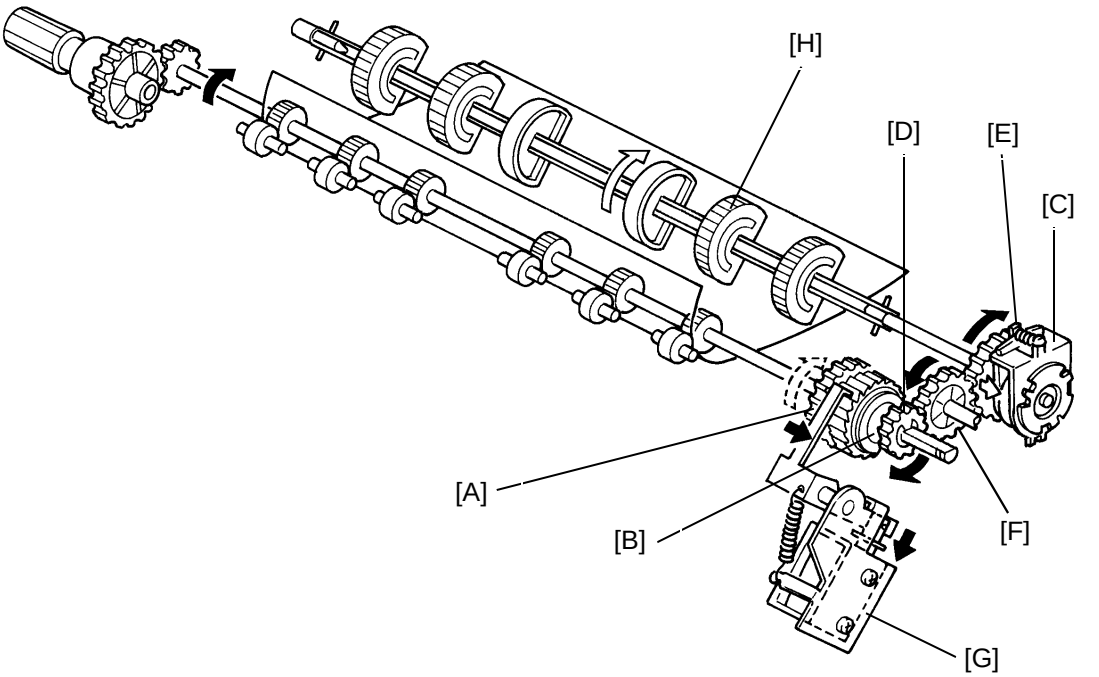
10.6.1 1st Feed Station



Through several gears and a timing belt, main motor rotation is transmitted to the relay gear [A] and then the 1st paper feed clutch gear [B]. The 1st paper feed clutch gear turns the reverse roller drive gear [C]. The paper feed timing is controlled by the 1st paper feed clutch [D].

The pick-up roller [E] is normally in contact with the paper stack. When the leading edge of the paper passes between the feed roller [F] and the reverse roller [G], the pick-up roller is then lifted up by the pick-up roller release solenoid [H]. After the trailing edge of the paper passes under the pick-up roller, the pick-up roller release solenoid is de-energized and the pick-up roller drops back onto the paper stack in preparation for the next copy cycle.

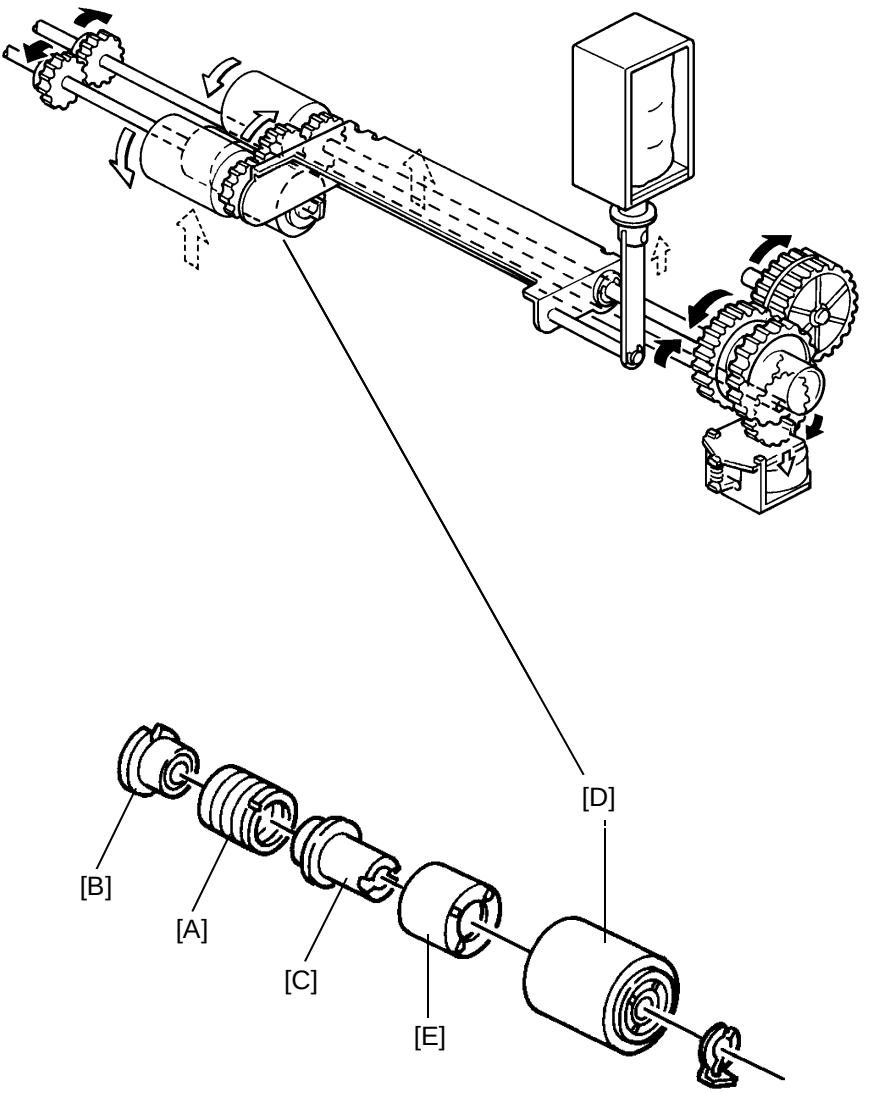
10.6.2 2nd Feed Station



Main motor rotation is transmitted to the relay roller clutch gear [A] through gears and a timing belt. The paper feed timing is controlled by the relay roller clutch [B] and the 2nd feed clutch [C]. The relay roller gear [D] transmits rotation to the 2nd feed clutch gear [E] through the relay gear [F] only when the relay roller clutch is on (when the relay clutch solenoid [G] is energized).

Both the relay roller clutch and the 2nd paper feed clutch turn on at the same time to start paper feed. The 2nd feed clutch is energized for 500 milliseconds to transfer drive to the 2nd feed roller shaft and turns the 2nd feed rollers [H]. The 2nd feed rollers stop turning when the 2nd feed clutch gear completes one rotation. The relay roller clutch solenoid stays energized until the leading edge of the paper reaches the registration rollers.

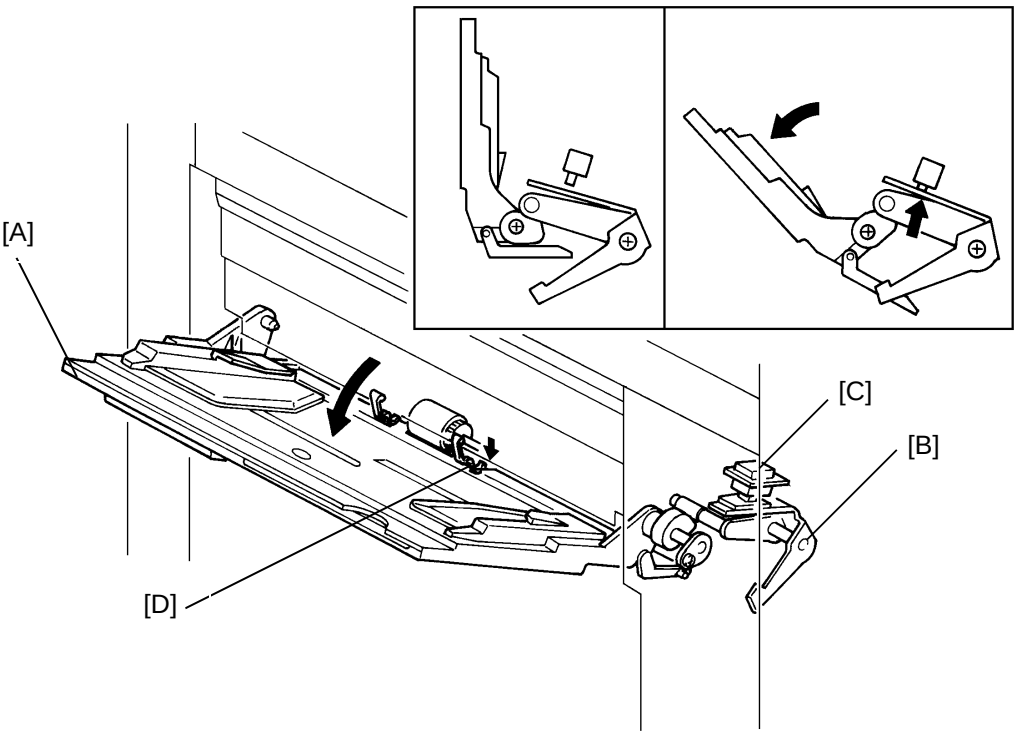
10.7 SLIP CLUTCH MECHANISM



[D]: Reverse Roller
[E]: Slip Clutch Cover

The slip clutch consists of two hubs connected by a drive spring [A]. The spring grips the input hub [B] loosely and grips the output hub [C] tightly. It will slip if the resistance to rotation is too great. The hubs and spring are precisely machined, and the output hub and spring slip when a single sheet of paper feeds between the feed roller and reverse roller.

10.8 MANUAL FEED TABLE

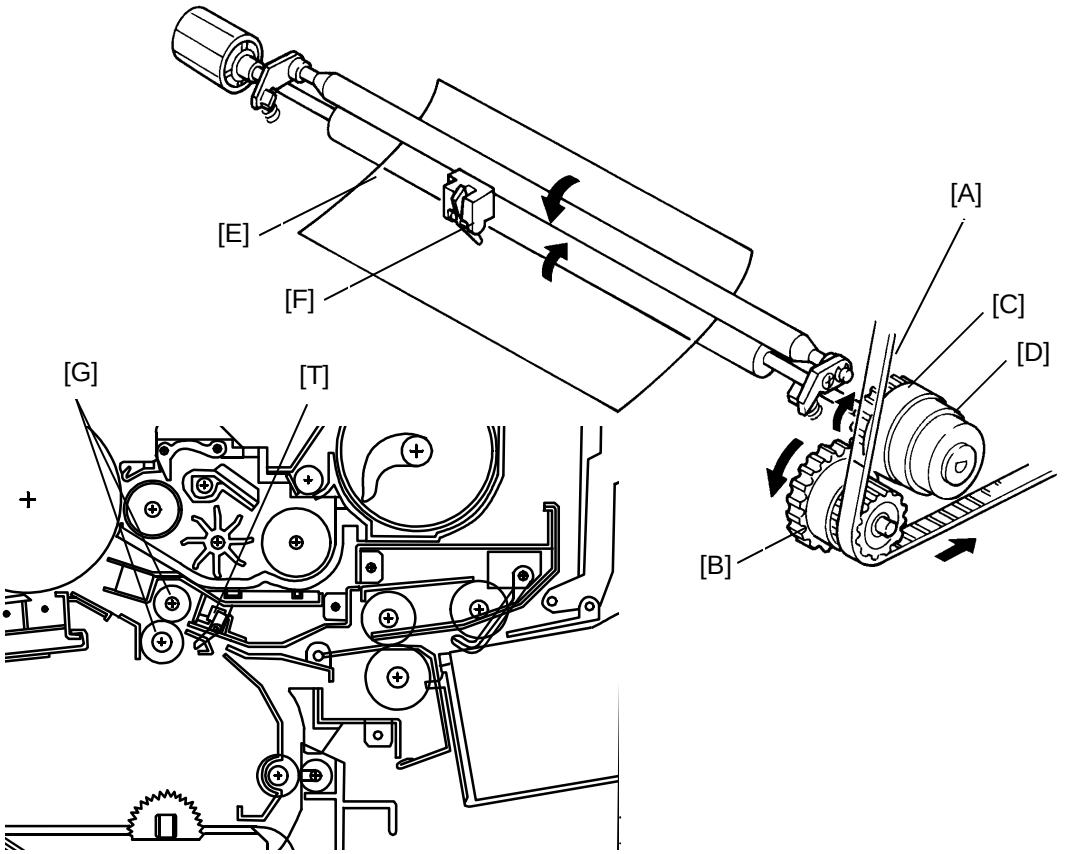


The manual feed table [A] uses the same feed mechanism as the first feed station and a maximum of 50 sheets of standard weight paper can be loaded. When the manual feed table is opened, a release lever [B] activates the manual feed table switch (SW9) [C] and releases the paper lift-up clutch unit mechanically to drop down the cassette bottom plate. At the same time the pick-up roller release solenoid turns on to release the pick-up roller and the paper end feeler [D] drops down into a slot in the manual feed table and the Add Paper indicator lights.

The manual feed table switch sends a LOW signal to the main board so that the Manual Feed indicator turns on and the pick-up roller is lifted up.

When paper is loaded onto the manual feed table, the paper end sensor is de-actuated and the Add Paper indicator turns off.

10.9 PAPER REGISTRATION



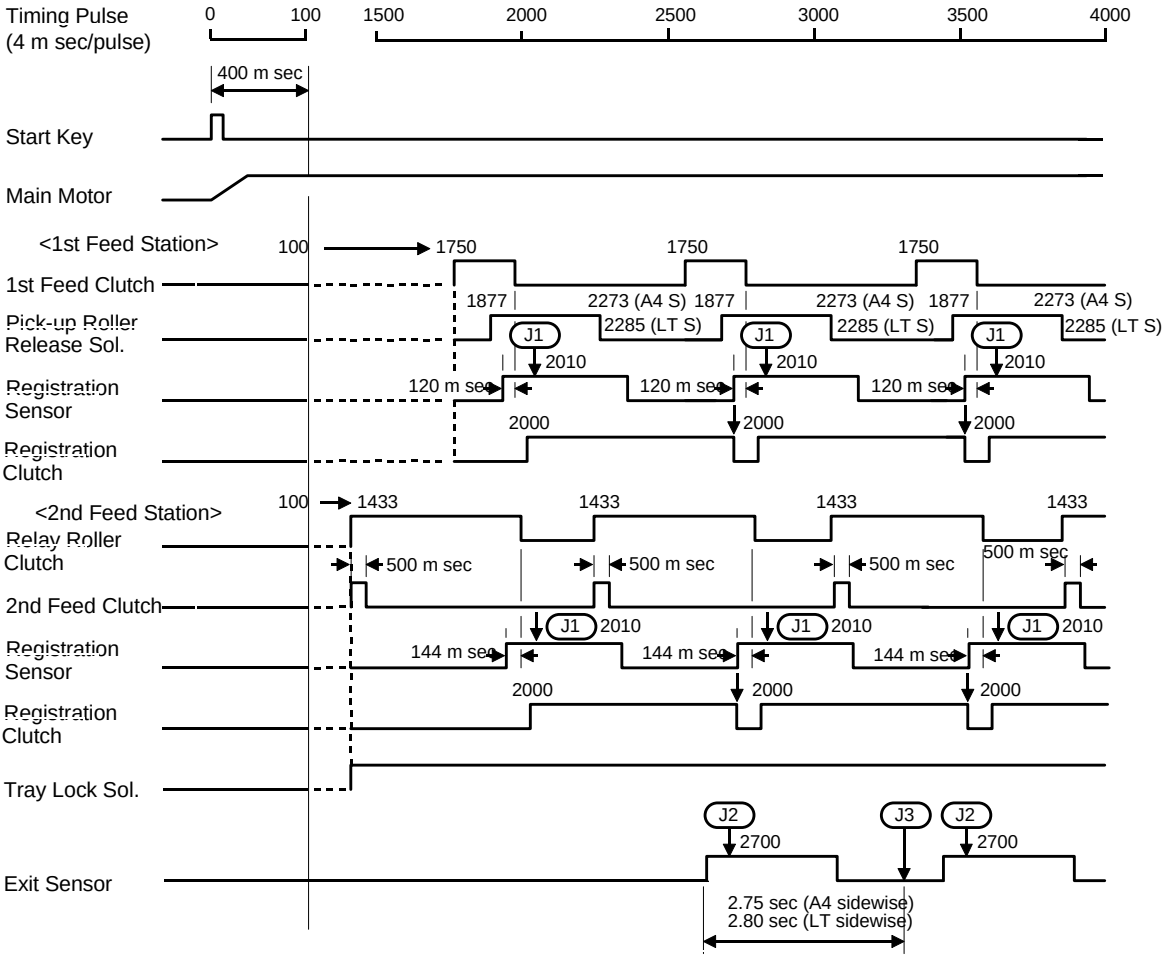
Main motor rotation is transmitted to the timing belt [A] through a series of gears. The timing belt rotate the relay gear [B] and then the registration roller clutch gear [C]. When the registration clutch [D] is energized, the rotation of the clutch gear is transmitted to the lower registration roller [E].

The registration rollers can be rotated by a knob in the front to ease misfed paper removal.

The registration sensor [F], which is positioned just before the registration rollers [G], controls the paper feed stop timing. The 1st paper feed clutch stays on for 120 milliseconds and the relay roller clutch (2nd feed station) stays on 144 milliseconds after the leading edge of paper actuates the registration sensor. At the end of the period, the CPU turns off the 1st paper feed clutch or the relay roller clutch. This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew.

The CPU energizes the registration clutch 1.4 seconds after the Start key is pressed. The registration rollers then feed the paper to the image transfer section.

10.10 PAPER FEED AND MISFEED DETECTION TIMING



PAPER FEED AND MISFEED DETECTION TIMING

The registration sensor and the exit sensor monitor the movement of the paper through the paper path. If the CPU determines that a misfeed exists, the Check Paper Path and the Misfeed Location indicators turn on. When the main switch is turned on, the CPU checks these two sensors for initial misfeed. During the copy cycle, the CPU performs three kinds of misfeed detection:

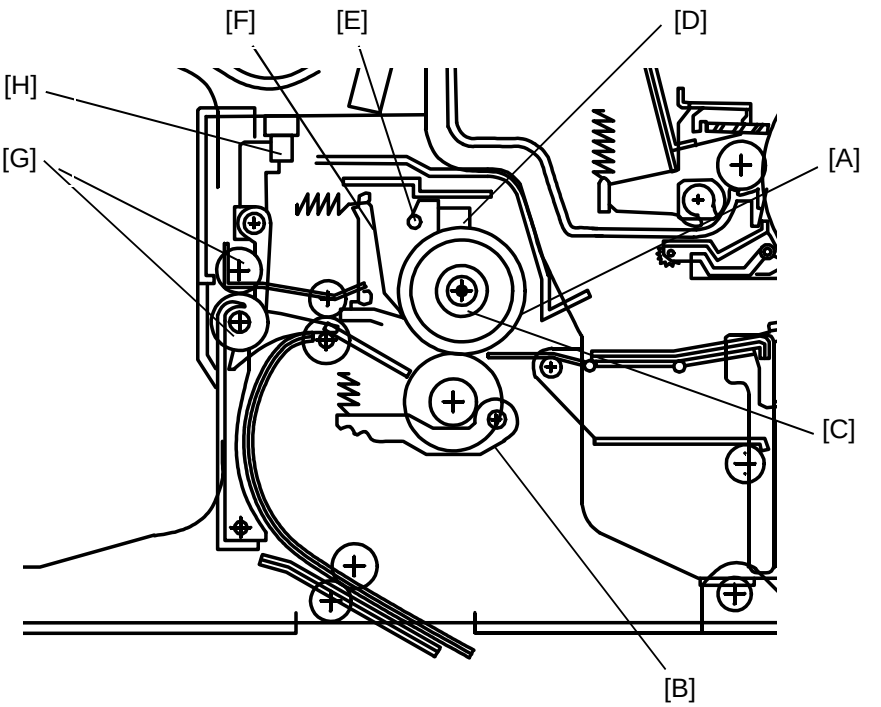
J1: Checks whether the registration sensor is actuated within 10 pulses (40 milliseconds) after the registration clutch turns on. (The Misfeed Location indicator "A" or "B" turns on.)

J2: Checks whether the exit sensor is actuated within 700 pulses (2.8 seconds) after the registration clutch turns on. (The Misfeed Location indicator "C" turns on.)

J3: Checks whether the copy paper has passed through the exit sensor 2.75 (A4 sideways) or 2.80 (Letter sideways) seconds after the exit sensor has been actuated. (The Misfeed Location indicator "D" turns on.)

11. IMAGE FUSING

11.1 OVERVIEW

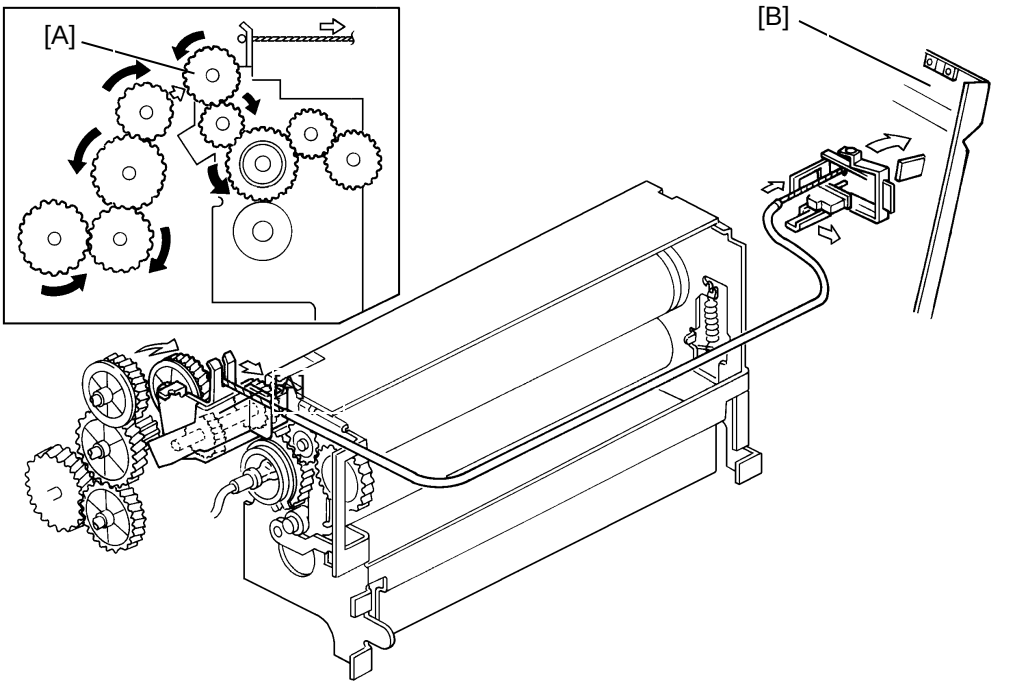


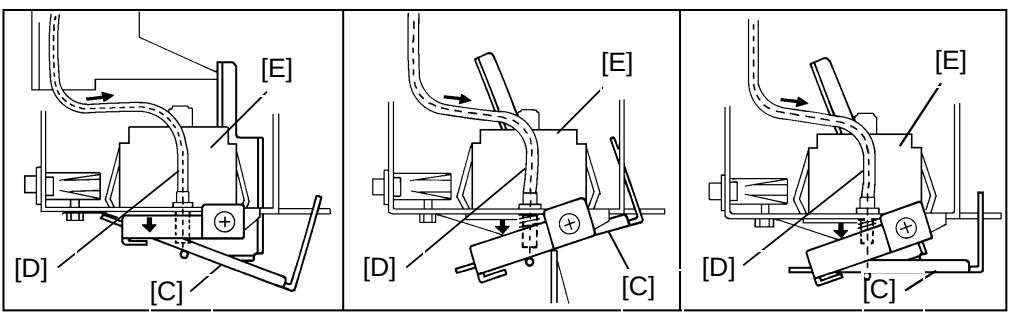
After the image is transferred, the copy paper enters the fusing unit. There the image is fused to the copy paper by the process of heat and pressure through the use of a hot roller [A] and pressure roller [B].

The fusing lamp [C] located inside the hot roller is turned on and off to maintain the operating temperature of 185 ^{o}C. The CPU monitors the hot roller surface temperature through a thermistor [D] which is in contact with the hot roller's surface. A thermofuse [E] protects the fusing unit from overheating.

The hot roller strippers [F] separate the copy paper from the hot roller and direct it to the exit rollers [G]. The exit sensor [H] monitors the progress of the copy paper through the fusing unit and acts as a misfeed detector while the exit rollers drive the copy paper to the copy tray. When the sorter is installed, the paper sensor on the sorter also functions as a misfeed detector.

11.2 FUSING DRIVE RELEASE MECHANISM AND COVER SAFETY SWITCH





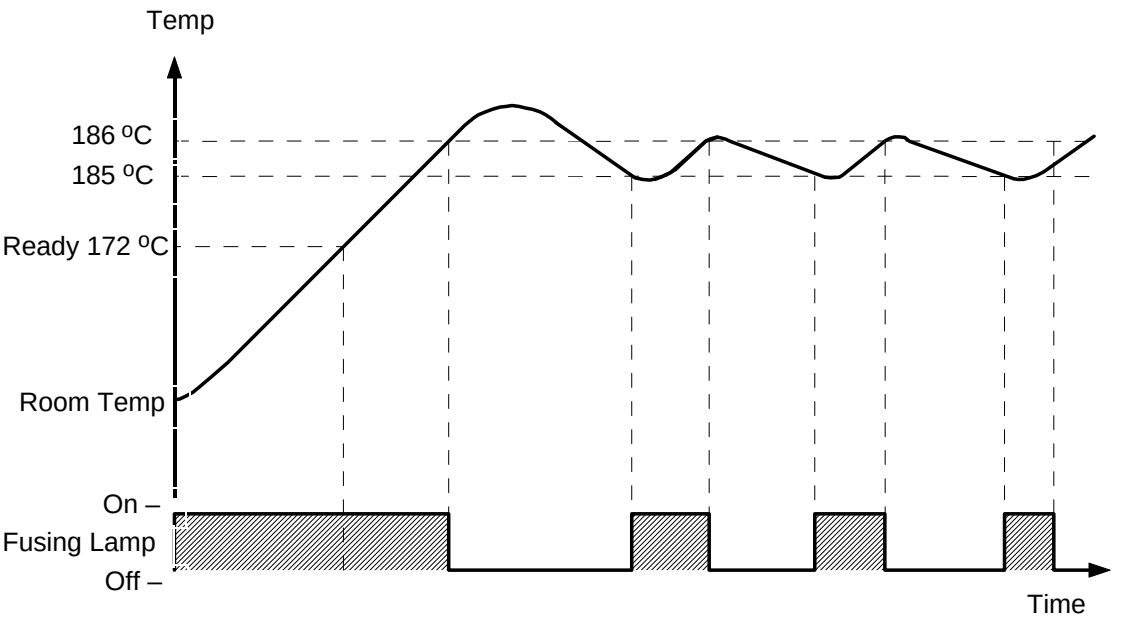
The front cover is opened. The exit cover is opened. The front cover and exit cover are opened.

The fusing unit drive release mechanism automatically disengages the fusing unit drive gear [A] when the front cover [B] or the exit cover is opened. This allows the fusing unit drive gear to rotate freely so that misfed paper can be easily removed.

When the front cover and/or the exit cover is opened, the actuator plate [C] pulls release wire [D] and the fusing unit drive gear is disengaged.

The actuator plate also releases the cover safety switch [E] removing all power from the copier and the optional peripherals.

11.3 FUSING LAMP CONTROL



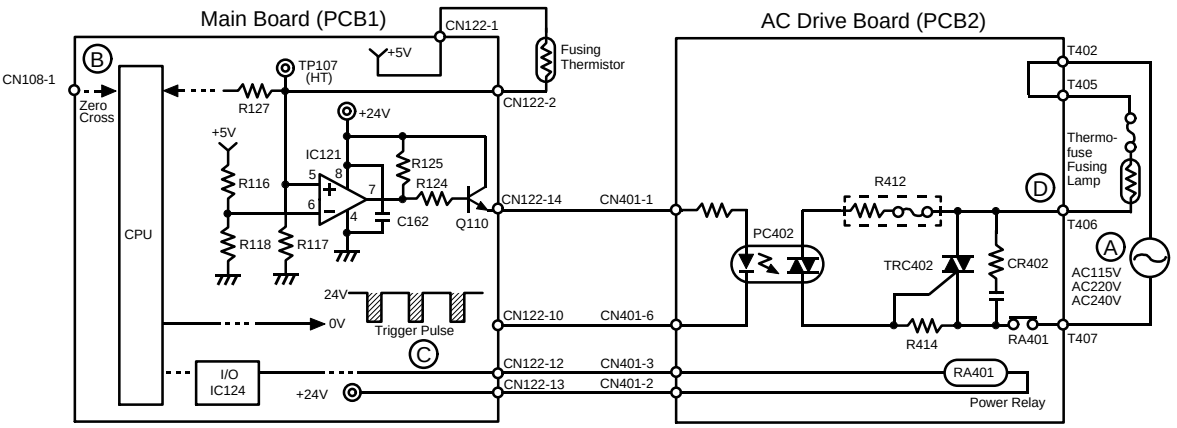
When the main switch is turned on, the CPU starts sending a trigger pulse to the fusing control circuit. The fusing control circuit then applies power to the fusing lamp. The power is applied until the CPU detects the ready temperature (172 ^{o}C) through the fusing thermistor. This should take less than 60 seconds. Once the CPU detects the ready temperature, the CPU changes the timing of the fusing lamp on/off check (checks whether the fusing lamp should be turned on or off) from every 1 second to every 5 seconds.

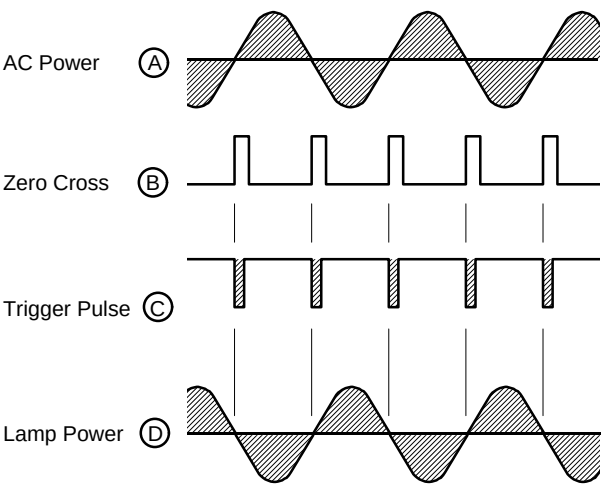
During warm-up, the thermistor's temperature lags behind the real hot roller's temperature. As a result, when the thermistor senses the ready temperature, the hot roller is already at or near the operating temperature. At this time the Ready indicator turns on.

After that, the trigger pulse is turned on constantly when thermistor detects a temperature less than 185 ^{o}C, and is turned off when the thermistor detects 186 ^{o}C.

If the fusing lamp (700W) is turned on or off when the exposure lamp is on, the power supplied to the exposure lamp will fluctuate, possibly degrading the copy image. To prevent this, the fusing lamp does not switch during scanning; it stays either on or off.

11.4 FUSING LAMP CONTROL CIRCUIT



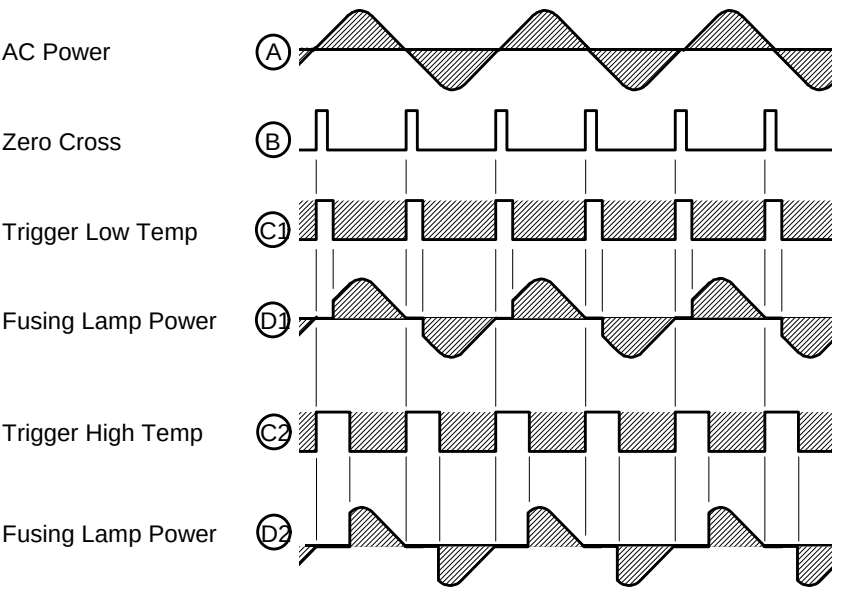


The main board monitors the fusing temperature through a thermistor. It also uses the zero cross signal generated by the dc power supply board to accurately control the applied power.

Normally, the voltage applied to the lamp is a full ac waveform. However, through SP mode #29, fusing power can be phase controlled. (Normally, phase control is used only if the customer has a problem with electrical noise or interference.)

When the main switch is turned on, the main board starts to output a trigger pulse [C], which has the same timing as the zero cross signal [B], to the ac drive board. This trigger pulse allows maximum ac power to be applied to the fusing lamp. When the operating temperature is reached, the CPU stops outputting the trigger pulse (trigger goes HIGH) and the fusing lamp turns off.

11.4.1 Phase Control Mode



The main board sends the fusing lamp trigger pulse (LOW active) [C] to the ac drive board. PC402 activates TRC402, which provides ac power to the fusing lamp at the trailing edge of each trigger pulses. The trigger pulse goes HIGH when the main board receives the zero cross signal.

The amount of time that power is applied to the fusing lamp [D] depends on the temperature of the hot roller.

The trigger pulse (LOW part) is wider [C1] when the hot roller temperature is lower, and it is narrower [C2] when the hot roller is near the operating temperature.

11.4.2 Overheat Protection

IC121 and Q110 form an overheat protection circuit. When the fusing lamp is controlled within the normal range, pin 7 of IC121 stays LOW; therefore, Q110 stays on, allowing PC402 to operate. If the hot roller temperature reaches 240 ^{o}C, the resistance of the thermistor becomes too low. At that time, pin 7 of IC121 becomes HIGH, turning off Q110 and stopping PC402. At the same time "E53" lights on the operation panel and the power relay (RA401) turns off.

Even if the thermistor overheat protection fails, a thermofuse is installed in series with the fusing lamp. If the thermofuse temperature reaches 169 ^{o}C, the thermofuse opens, removing power from the fusing lamp.

11.5 SERVICE CALL CONDITIONS

Service Code 52: Fusing Warm-up Error

The temperature detected by the thermistor does not reach 175 °C within 100 seconds after the main switch is turned on.

Service Code 53: Fusing Overheat

The temperature detected by the thermistor becomes higher than 240 °C.

Service Code 55: Fusing Thermistor Open

The temperature detected by the thermistor does not reach 2 °C within 30 seconds after the main switch is turned on.

When these service call conditions occure, for safety reason can not be cleared by turning off/on the main switch. The following procedure must be performed to clear these service call conditions:

1. Turn on the main switch.
2. Turn DIP switch 101-1 on and off.
3. Turn the main switch off and on.

NOTE: If the cause of the service call condition is not removed, the service code will be displayed again after this procedure.

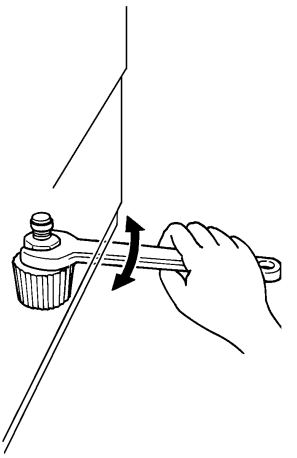
SECTION 3
INSTALLATION

1. INSTALLATION REQUIREMENTS

1.1 ENVIRONMENT

1. Temperature Range: 10°C to 30°C (50°F to 86°F)
2. Humidity Range: 15% to 90% RH
3. Ambient Illumination: Less than 1,500 lux (do not exposure to direct sunlight)
4. Ventilation: Room of more than 30 m^3. Room air should turn over at least 3 times/hour.
5. Ambient Dust: Less than 0.15 mg/m^3 (4×10^{-3} oz/yd^3)
6. If the installation place is air-conditioned or heated, place the machine as follows:
   a) Where it will not be subjected to sudden temperature changes.
   b) Where it will not be directly exposed to cool air from an air-conditioner in the summer.
   c) Where it will not be directly exposed to reflected heat from a space heater in winter.
7. Avoid placing the machine in an area filled with corrosive gas.
8. Avoid any places higher than 2,000 meters (6,500 feet) above sea level.
9. Place the machine on a strong and level base.
10. Avoid any area where the machine may be subjected to frequent strong vibration.

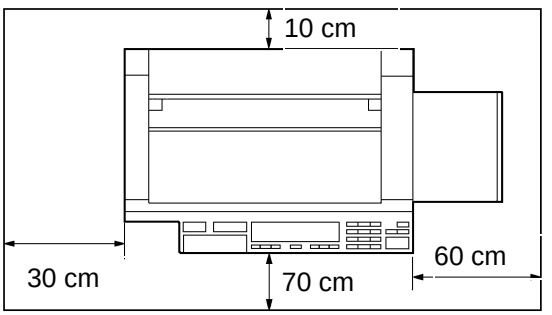
1.2 MACHINE LEVEL

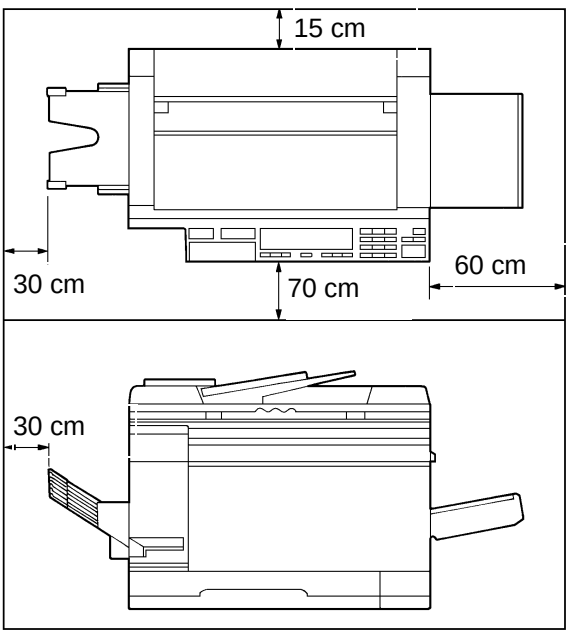


1. Front to back: Within 5 mm (0.2") of level
2. Right to left: Within 5 mm (0.2") of level

Place the machine on a table and screw the leveling feet up or down in order to level the machine. Use a leveling gauge if necessary.

1.3 MINIMUM SPACE REQUIREMENTS





1. Front: 70 cm (27.6")
2. Back: 10 cm (3.9")
   : 15 cm (6.0")
   (when the sorter is installed.)
3. Right: 80 cm (31.5")
4. Left: 30 cm (11.8")

NOTE: Make sure there is at least 15 cm (6.0") clearance on the back side, in order to avoid damaging the sorter when it is opened.

1.4 POWER REQUIREMENTS

1. Input voltage level:

   110V/60Hz : More than 15A (for Taiwan)
   115V/60Hz : More than 15A (for N.A.)
   220V/50Hz : More than 8A (for EU.)
   220V/60Hz : More than 8A (for EU.)
   240V/50Hz : More than 8A (for EU.)

2. Permissible voltage fluctuation: ±10%

3. Do not set anything on the power cord.

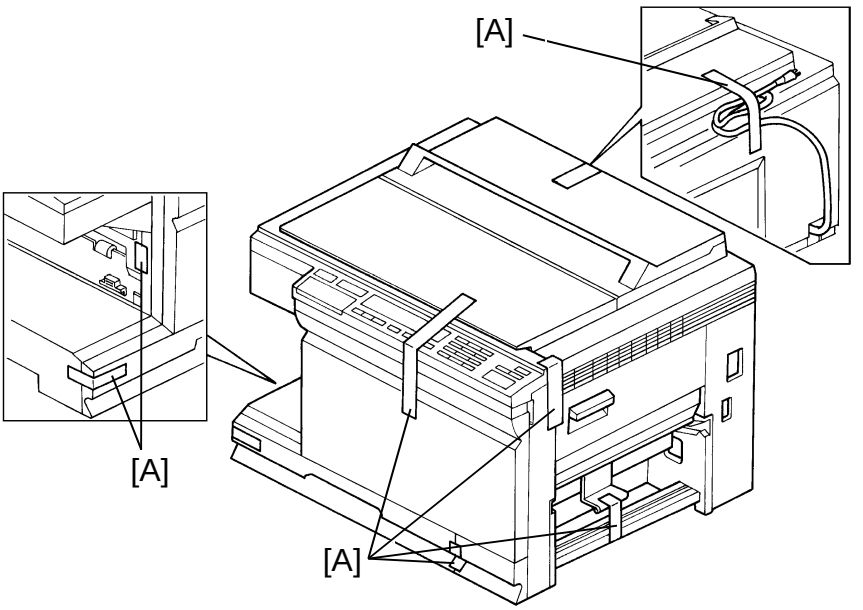
NOTE: a) Be sure to ground the machine. (Do not connect the grounding wire to a gas pipe.)

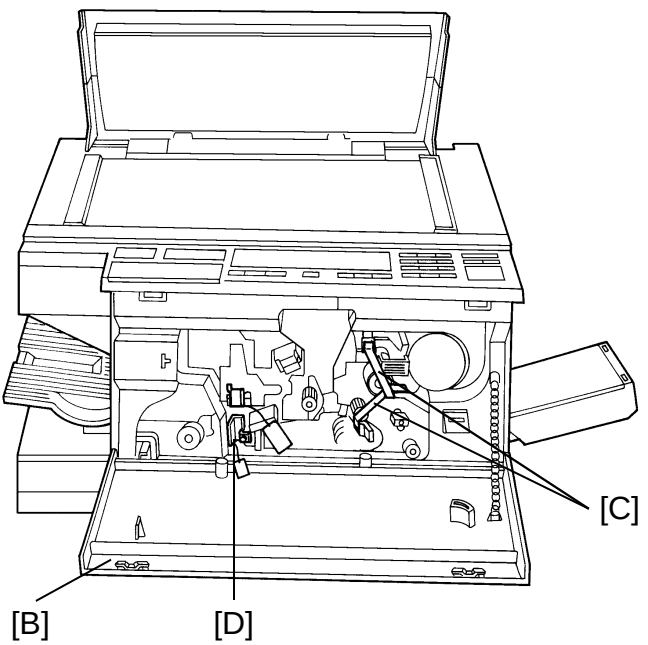
b) Make sure the plug is firmly inserted in the outlet.

c) Avoid multi-wiring.

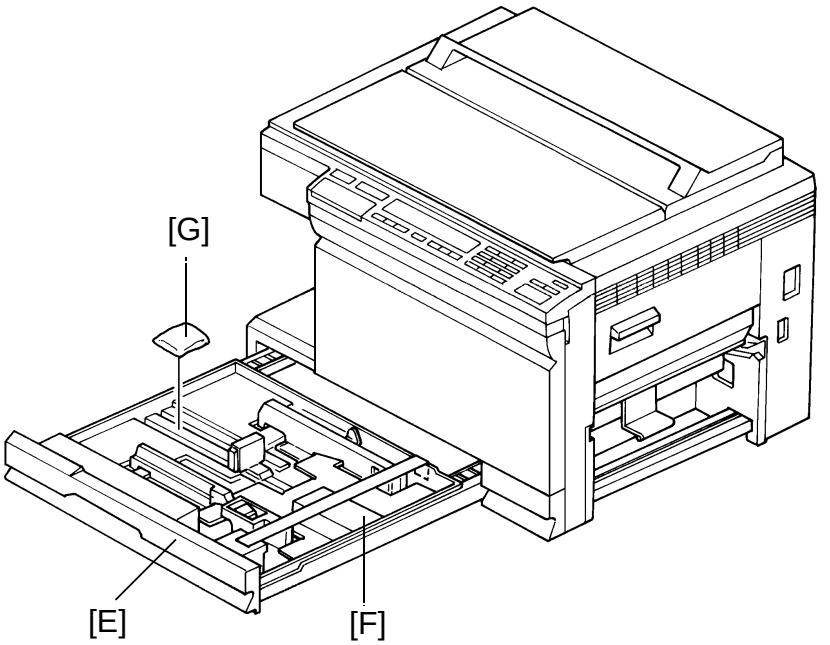
2. INSTALLATION PROCEDURE

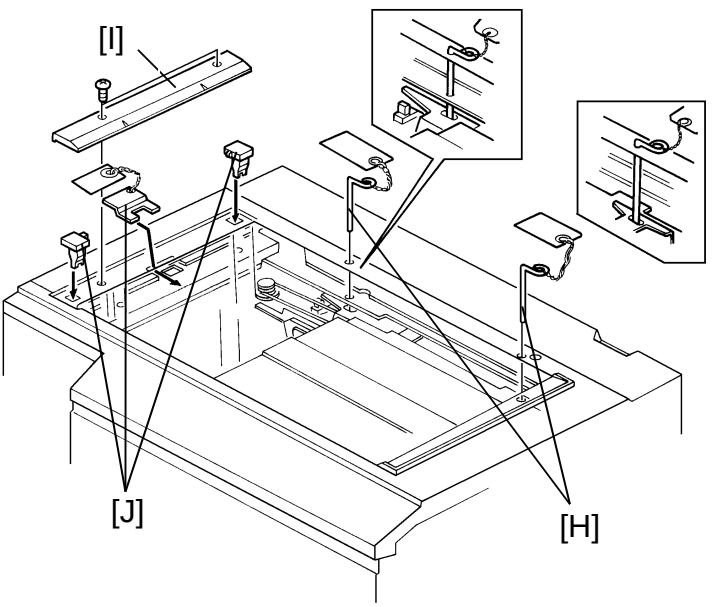
2.1 COPIER INSTALLATION





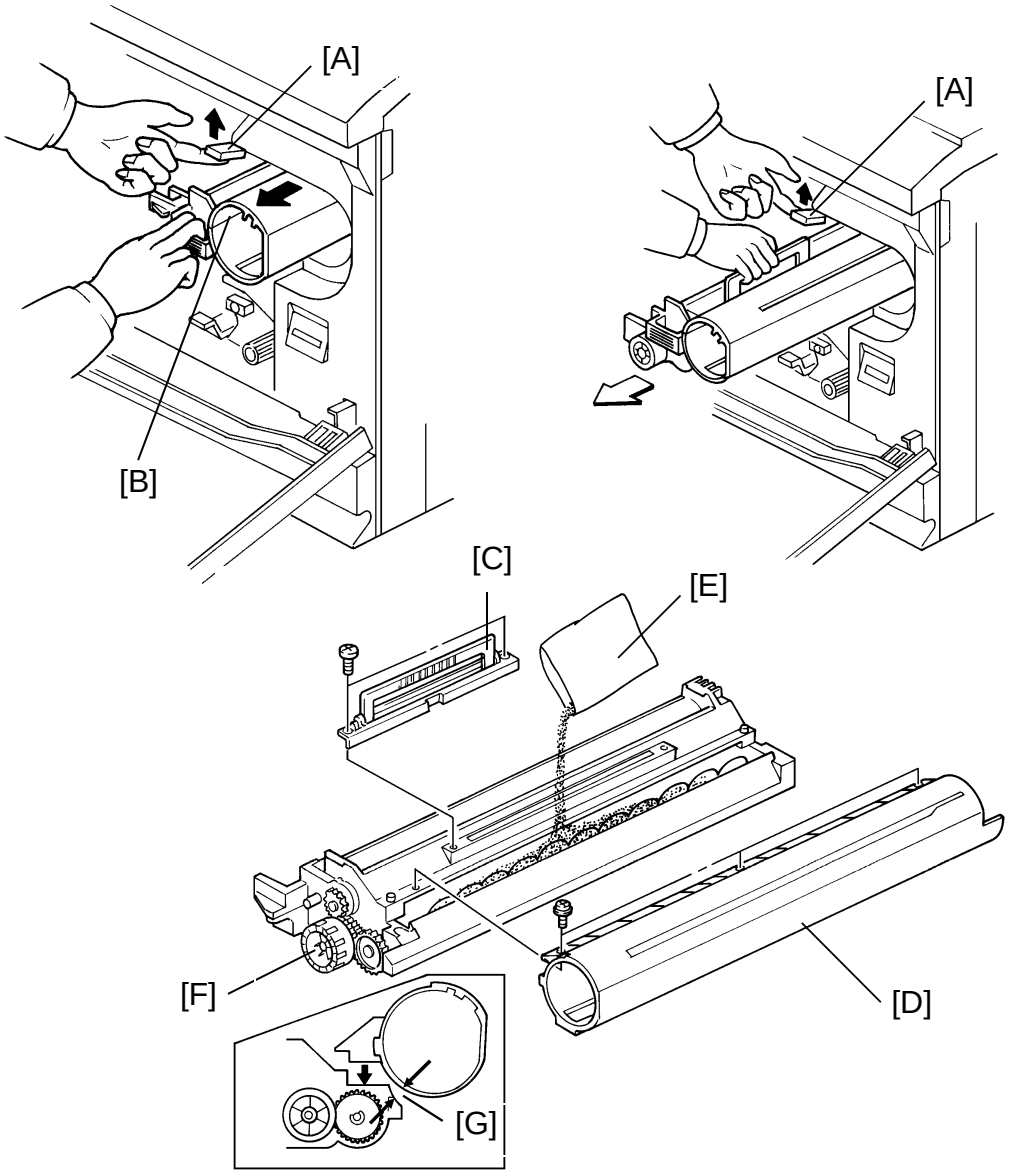
1. Remove the strips of tape [A] from the copier at the locations shown.
2. Open the front cover [B], and remove the strips of tape [C].
3. Remove the transport unit lock plate [D] (2 screws).





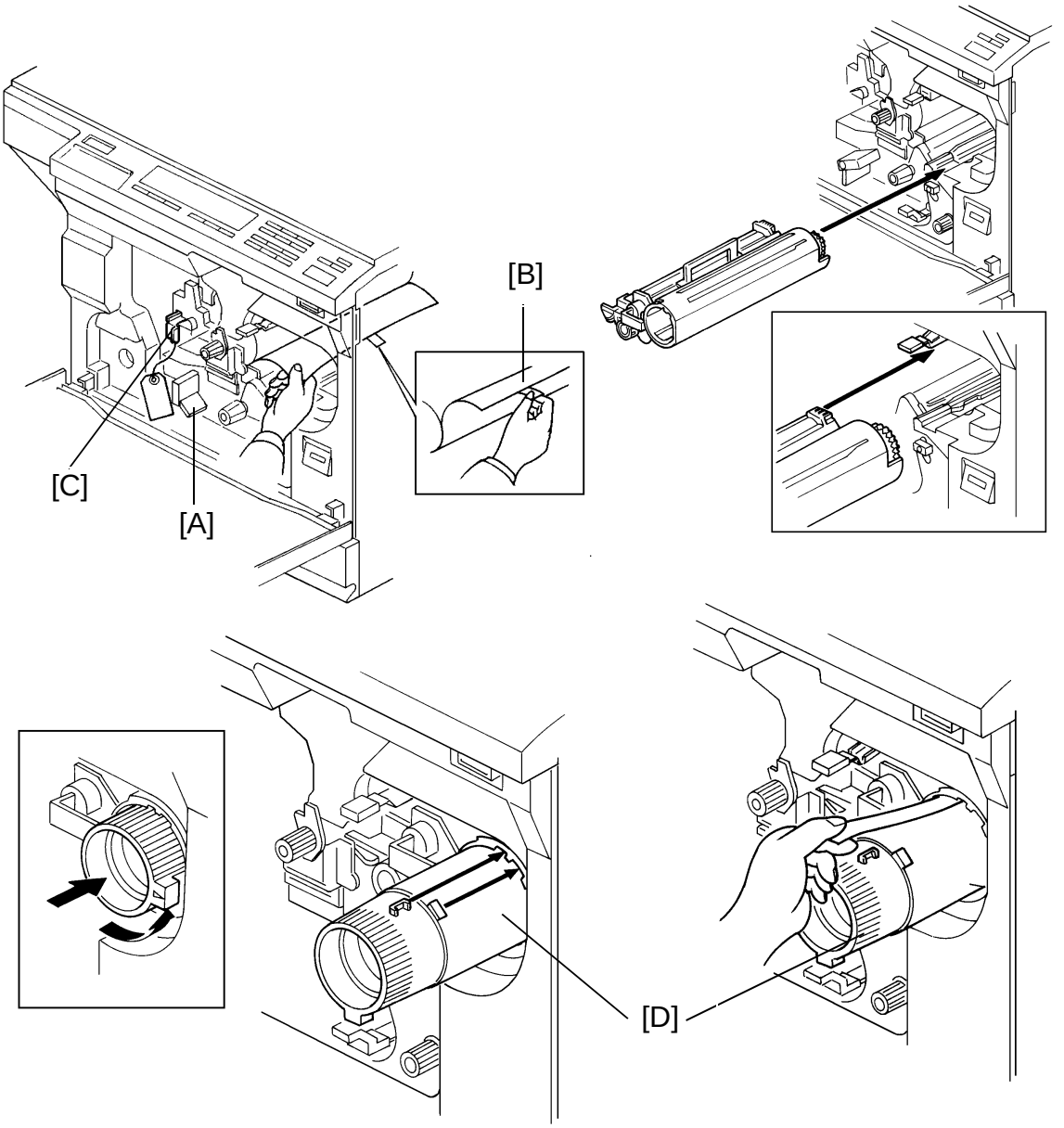
4. Pull out the paper tray [E] and remove the foam block [F], tape, and silica gel [G].
5. Open the platen cover and remove the optics lock pins [H].
6. Remove the left scale [I] (2 screws) and the scanner lock plates [J].

NOTE: Save the lock pins [H] and lock plates [D and J] for future use.



7. Raise the development unit lock lever [A], pull out the development unit [B], and place it on a clean sheet of paper.
8. Remove the filter bracket [C] (2 screws). (The development unit handle is attached.)
9. Remove the toner tank [D] from the development unit (3 screws).
10. Pour one pack of developer [E] into the development unit while turning the development roller knob [F] counterclockwise to distribute the developer.
11. Reinstall the toner tank and the filter bracket on the development unit.

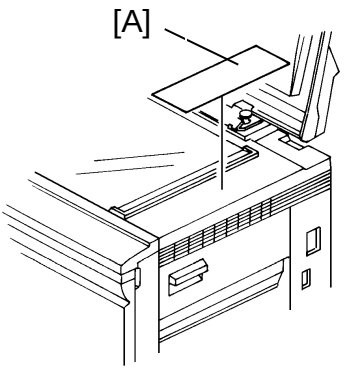
NOTE: Make sure that there is no gap [G] between the toner tank and the development unit.

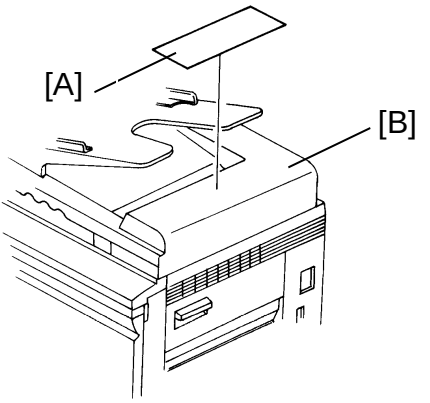


12. Lower the transport unit lever [A].
13. Remove the drum protective sleeve [B].
14. Remove the lock plate [C] from the cleaning blade release lever.

NOTE: Save the lock plate for future use.

15. Reinstall the development unit as shown.
16. Shake the toner cartridge [D] well to distribute the toner evenly inside the cartridge. Then, install the cartridge as shown above.





17. Plug in the machine and turn on the main switch, then place a few sheets of white paper (A3 or 11"x17") on the exposure glass and lower the platen cover.

18. Perform 220/240 Conversion (240V machine only), Black Developer Initial Setting, and the Toner End Check.

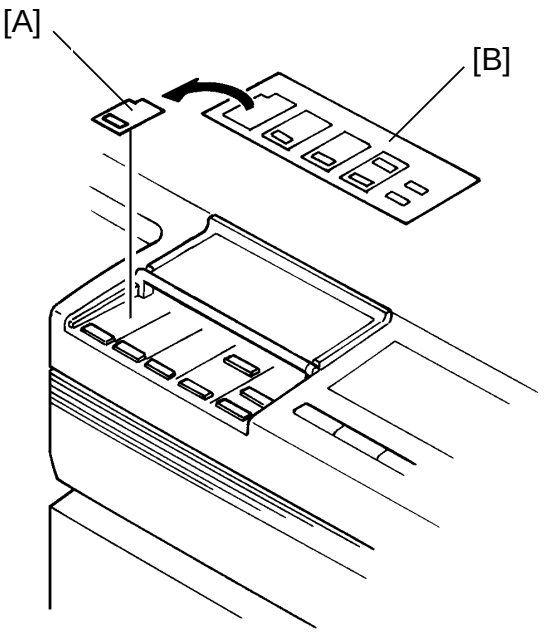
    To access the SP modes, press the following keys in the order given.
    (1) Clear Mode key
    (2) Clear/Stop key
    (3) Enter key

Access SP modes in the following sequence:

Step	SP MODE NUMBER		PROCEDURE
1	12	220/240 Conversion	This SP mode is only for 240 volt areas. Enter "12" using the numeral keys. Then, press the Enter key while holding down the Point key. Finally, change the data from "0" to "1".
2	65	Developer Initial Setting	Enter "65" using the numeral keys and press the Enter key. "20" will be displayed in the copy counter. Press the Start key for initial setting.
3	63	Toner Supply Unit Initial Setting	Enter "63" using the numeral keys and press the Enter key while holding down the Point key.

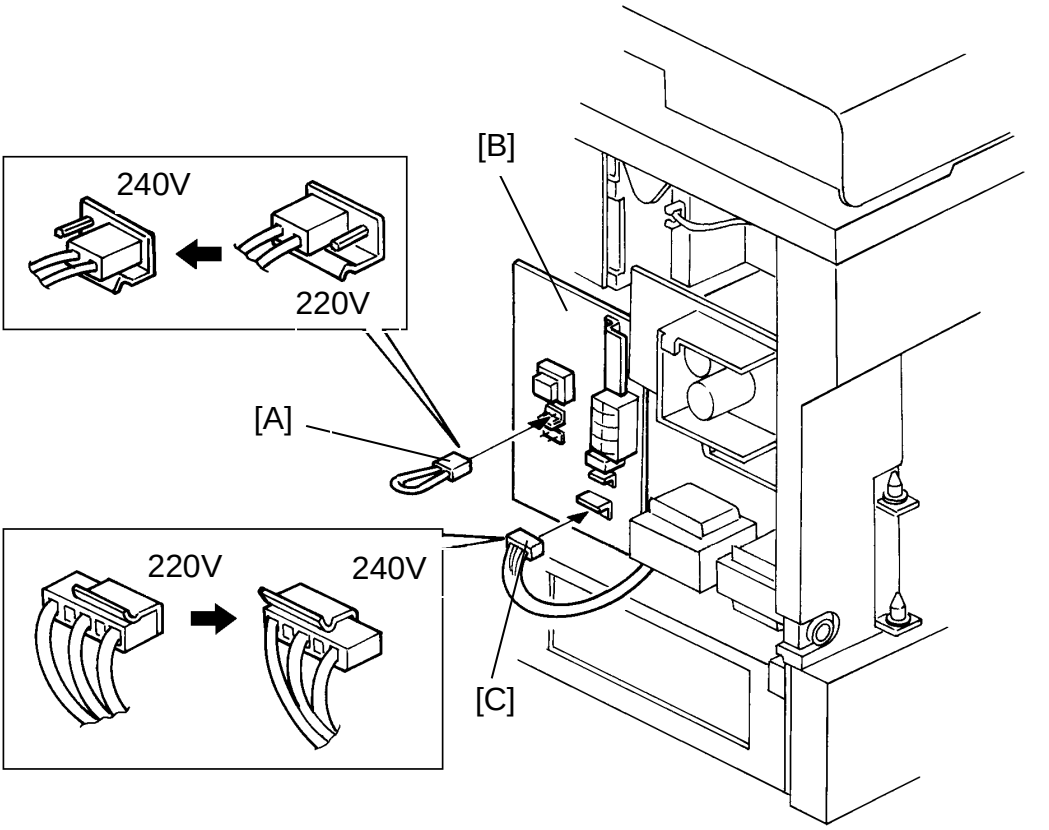
19. Place the outer decal (symbol explanation) [A] on the upper cover and install the receiving tray.

NOTE: If the DF is installed on the machine, place the outer decal [A] on the DF [B] as shown.



20. If an option (DF, Sorter, Duplex) is not installed on the machine, place a cover sheet [A] from sheet [B] over the operation panel as shown.
21. Load paper into the cassette and/or paper tray and check the machine operation and copy quality.

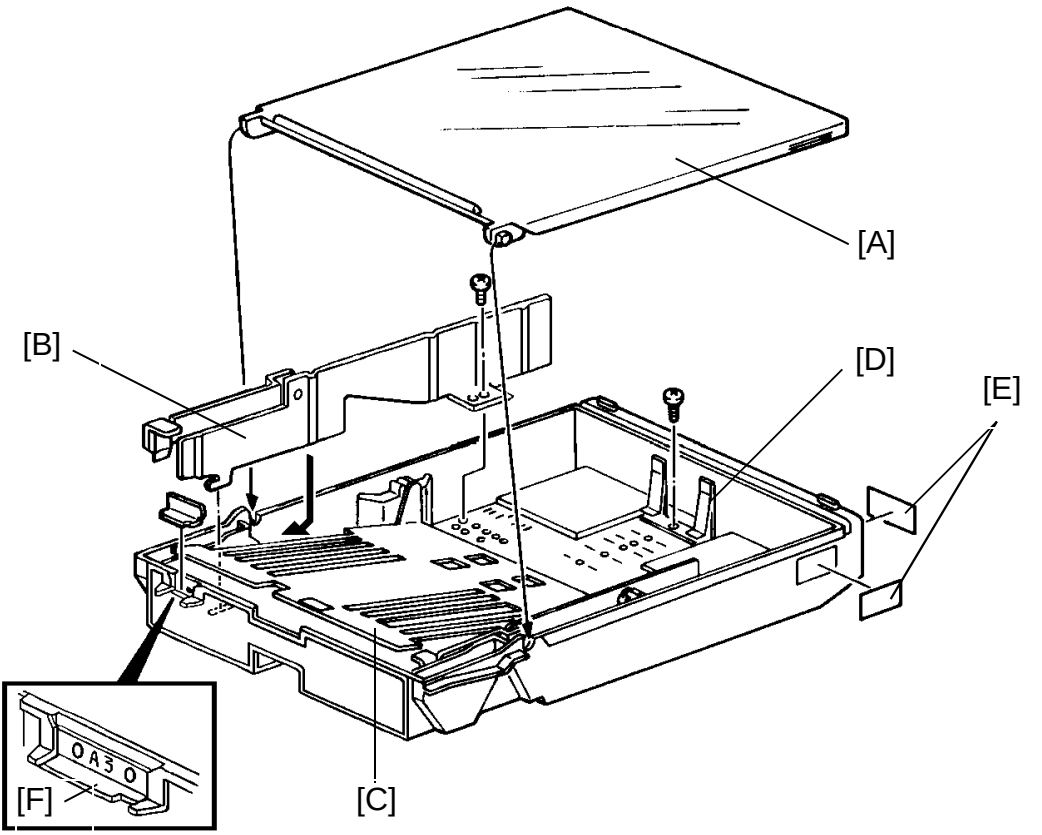
2.2 220/240V CONVERSION



NOTE: In areas where 240 volts is the standard, the connectors on the ac drive board must be repositioned as explained below. This procedure is also done after step 1 of the copier installation procedure.

1) Remove the rear cover (4 screws).
2) Disconnect the short connector [A] (2P/White) on the ac drive board [B] from CN421 and reconnect it to CN 421 as shown in the illustration.
3) Disconnect the transformer connector [C] (3P/White) on the ac drive board from CN417 and reconnect it to CN417 as shown in the illustration.
4) Reinstall the rear cover.
5) Change the data of SP mode #12 from "0" to "1". (Step 17 explains how to access the SP mode.)

2.3 CASSETTE MODIFICATION

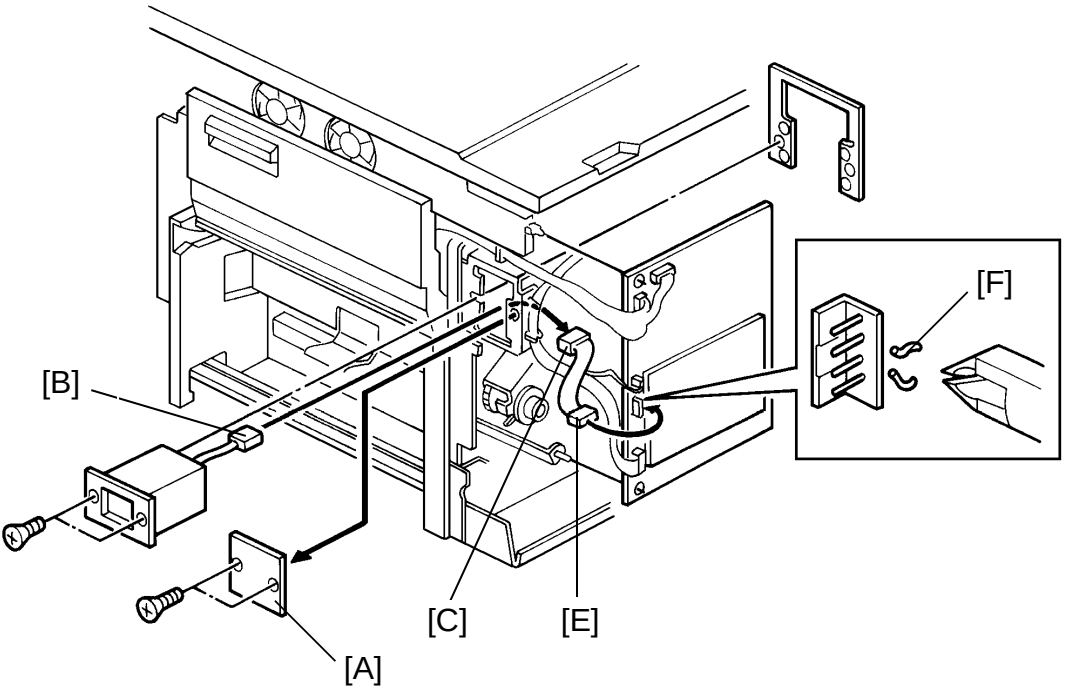


1. Take off the cassette cover [A].
2. Remove the side fences [B] (1 screw each) and the bottom plate [C].
3. Reposition the rear fence [D] in the desired paper size position (1 screw).

NOTE: Paper size positions are shown on the inside of the cassette.

4. Reinstall the bottom plate.
5. Reinstall the side fences in the desired size positions.
6. Attach the proper paper size decals [E] on the cassette at the positions shown.
7. Insert the actuator plate [F] in the slot on the front of the cassette as shown.

2.4 KEY COUNTER HOLDER INSTALLATION (OPTION)



1.Make sure that the main switch is turned off.

2. Open the front cover and the manual feed table.

3. Remove the right cover (4 screws).

4. Remove the key counter cover [A] (2 screws).

5. Connect the 4P connector [B] of the key counter holder to the key counter harness [C] through the key counter access hole.

6. Position the fixing plate [D] as shown in the illustration and insert the key counter holder.

7. Align the holes in the fixing plate with the mounting holes of the key counter holder and secure the key counter holder (2 screws).

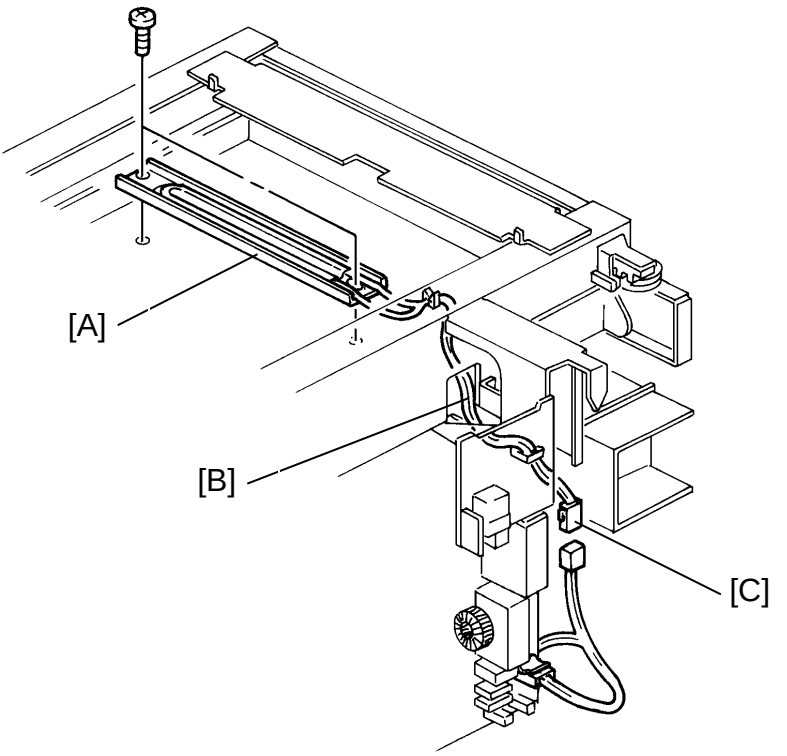
NOTE: The fixing plate has three different hole sizes. Use the holes that match those on the counter that you are installing.

8. Connect the other end of the key [E] counter harness to CN127 on the main board.

9. Cut off the jumper wire (JP103) [F] with a pair of pliers.

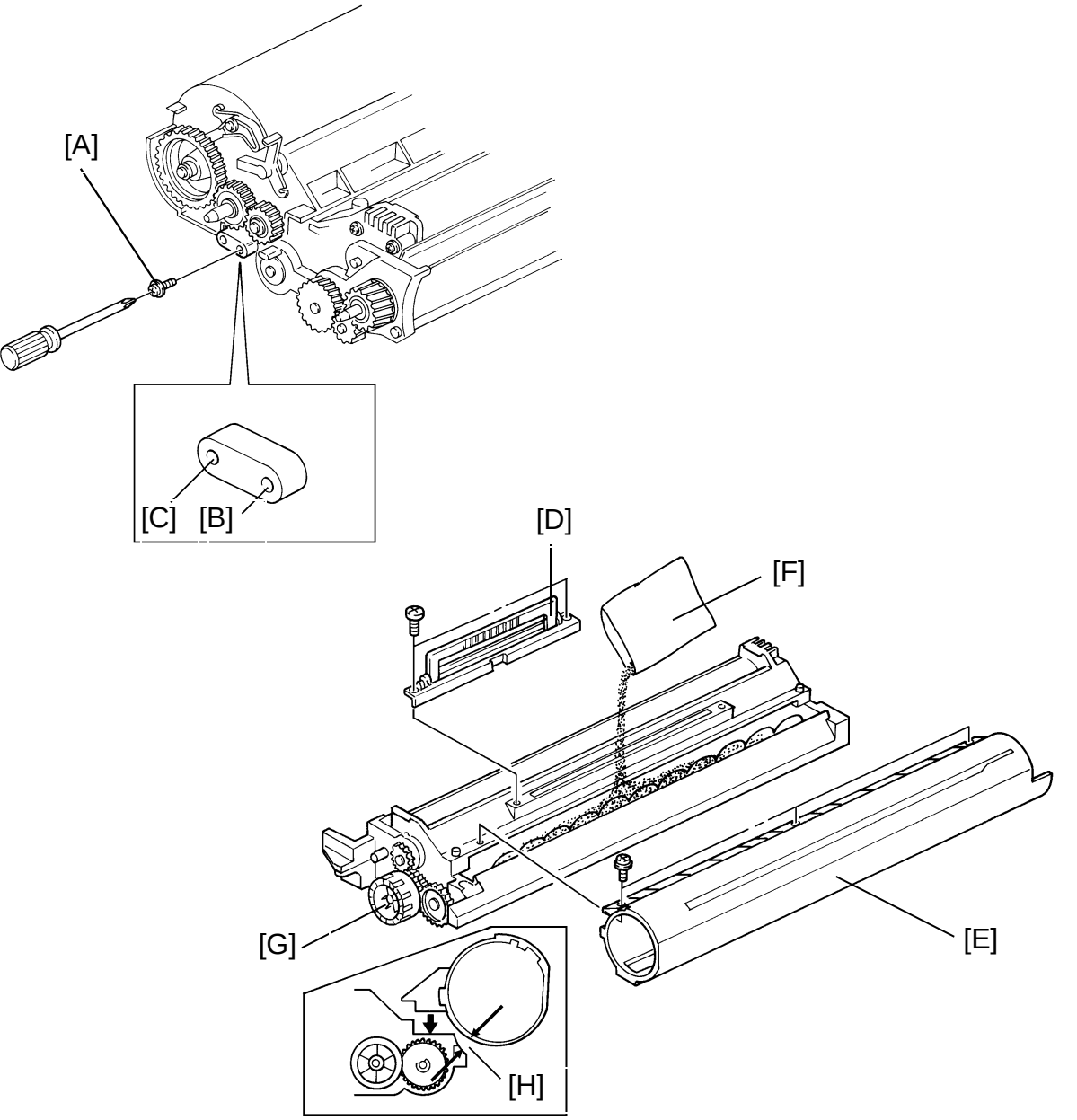
10. Reinstall all covers.

2.5 OPTICS ANTI-CONDENSATION HEATER INSTALLATION (OPTION)



1. Make sure that the main switch is turned off.
2. Remove the rear cover.
3. Remove the exposure glass. (See Exposure Glass Removal.)
4. Install the optics heater [A] in the optics cavity as shown (2 screws).
5. Wire the heater harness [B] and connect the connector [C] as shown.

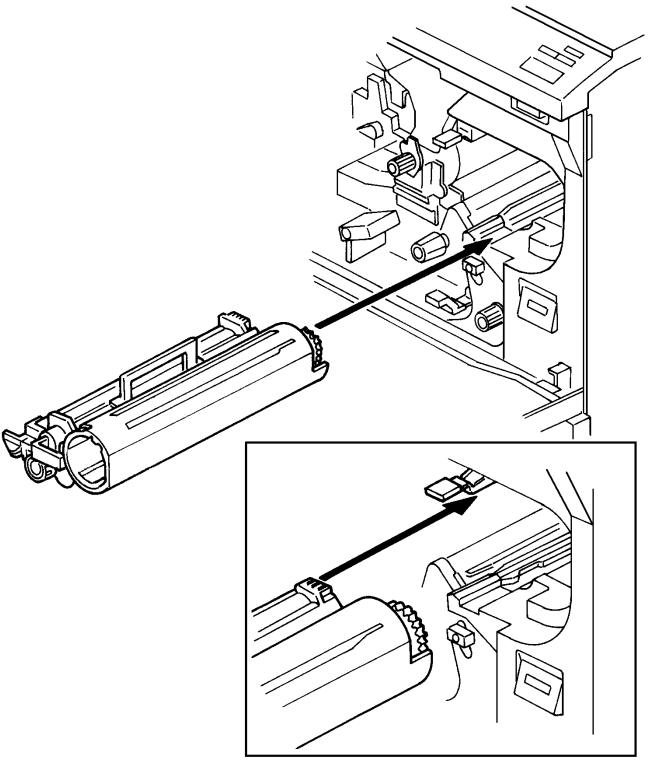
2.6 COLOR DEVELOPMENT UNIT INSTALLATION (OPTION)



NOTE: The two tapping screws (M4 x6) are enclosed as accessories.

1. Screw the tapping screws [A] into the holes at the rear side of the development unit as shown. Refer to the following table to determine the correct combination of screws for each color.

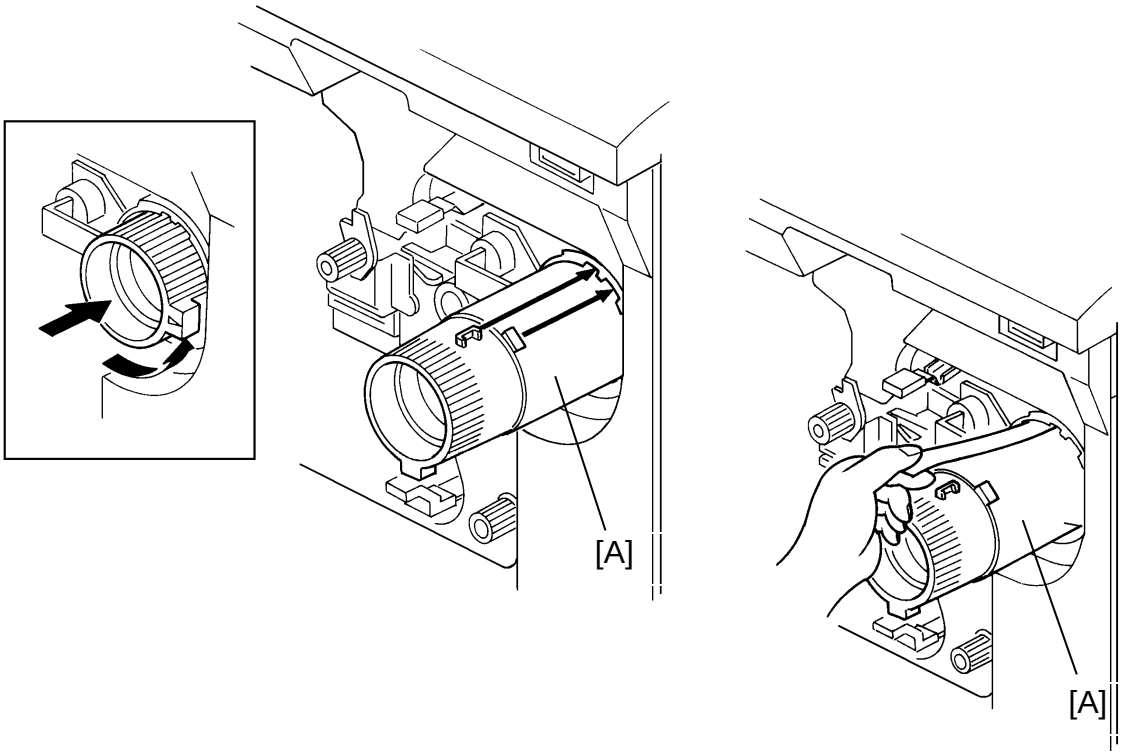
	Red	Green	Blue
Screw Hole [B]	Set	Not Set	Set
Screw Hole [C]	Not Set	Set	Set



2. Remove the filter bracket [D] (2 screws). (The development unit handle is attached.)
3. Remove the toner supply unit [E] from the development unit (3 screws).
4. Pour one pack of developer [F] into the development unit while turning the development roller knob [G] counterclockwise to distribute the developer.
5. Reinstall the toner supply unit and the filter bracket on the development unit.

NOTE: Make sure that there is no gap [H] between the toner supply unit and the development unit.

6. Install the development unit as shown.



7. Shake the toner cartridge [A] well to distribute the toner evenly inside the cartridge. Then, install the cartridge as shown.
8. Turn on the main switch and place a few sheets of white paper (A3 or 11" x 17") on the exposure glass. Then, lower the platen cover.
9. Perform Color Developer Initial Setting and Toner Supply Unit Initial Setting. To access the SP modes, press the following keys in order given.

   (1) Clear Mode key
   (2) Clear/Stop key
   (3) Enter key

   Access SP modes in the following sequence:

Step	SP MODE NUMBER		PROCEDURE
1	10	Color Developer Initial Setting	Enter "10" using the numeral keys and press the Enter key. "20" will be displayed in the copy counter. Press the Start key for initial setting.
2	63	Toner Supply Unit Initial Setting	Enter "63" using the numeral keys and press the Enter key while holding down the Point key.

10. Make a copy and check the copy quality.

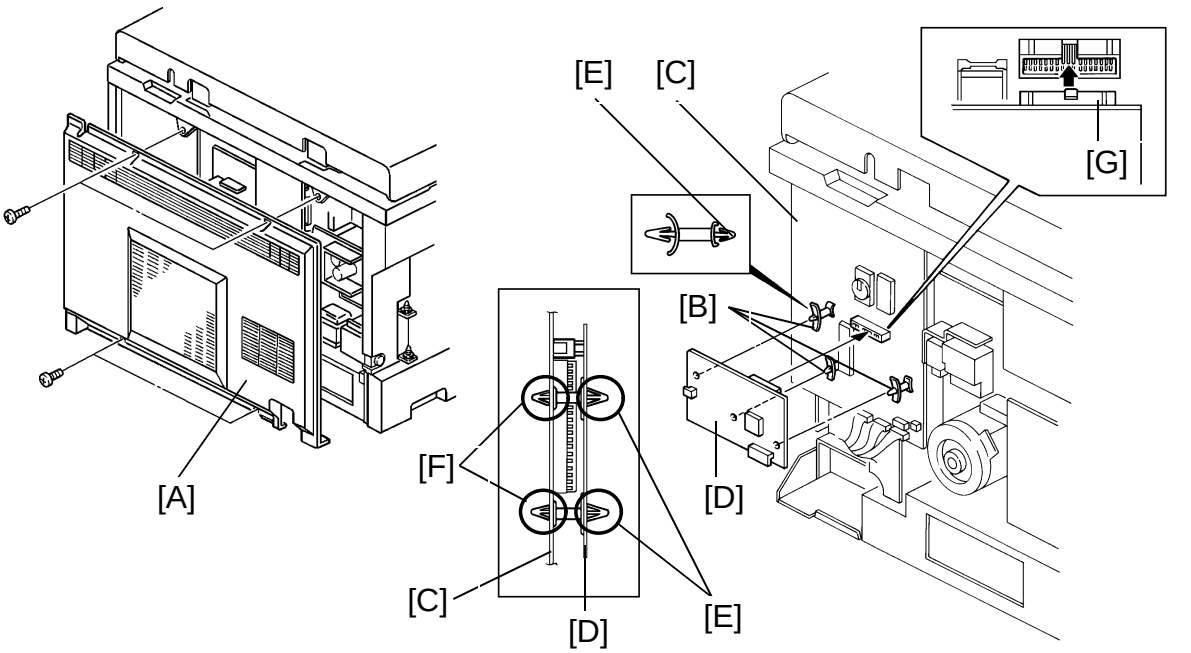
2.7 DC POWER SUPPLY UNIT INSTALLATION

Accessory Check

Check the quantity and condition of the accessories in the box according to the following list:

1. Interface Board 1
2. DC Power Supply Unit 1
3. Transformer 1
4. Locking Support - Short 1
5. Locking Support - Long 3
6. Locking Support Bracket 1
7. DC Power Supply Unit Bracket 1
8. Harness Support Bracket 1
9. DC Harness 1
10. Hexagon Head Tapping Screw - M3 x 6 6
11. Philips Pan Head Screw - M3 x 6 1

NOTE: Accessory Nos. 2 to 4 and 6 to 8 are not necessary to install the Sorter. However, all accessories should be installed for future use.



1. Make sure that the main switch is turned off and the power supply cord of the copier is unplugged.
2. Remove the rear cover [A] (4 screws).
3. Install the three locking supports (long) [B] on the main board [C] and install the interface board [D].

NOTE: 1. The smaller side [E] of the locking supports must be inserted through the main board as shown.

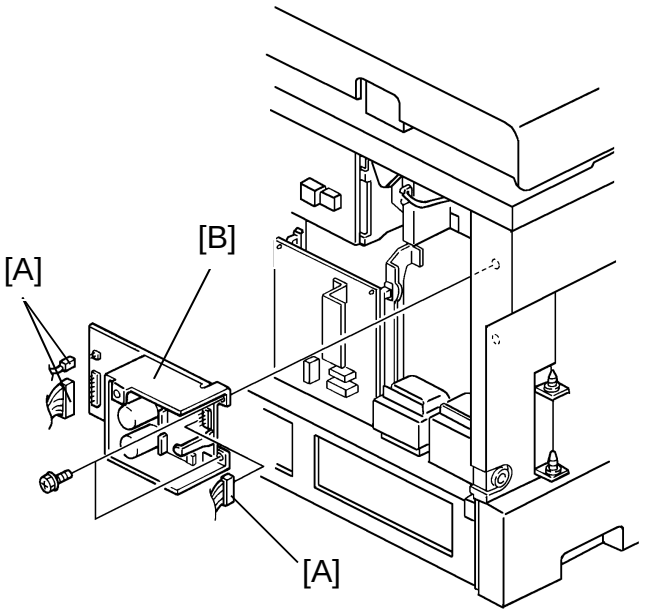
2. Be careful not to damage the main board when installing the locking supports and interface board.

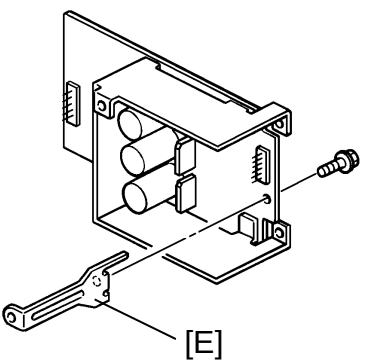
3. After installing the interface board on the main board, confirm the following items to prevent erratic malfunction.

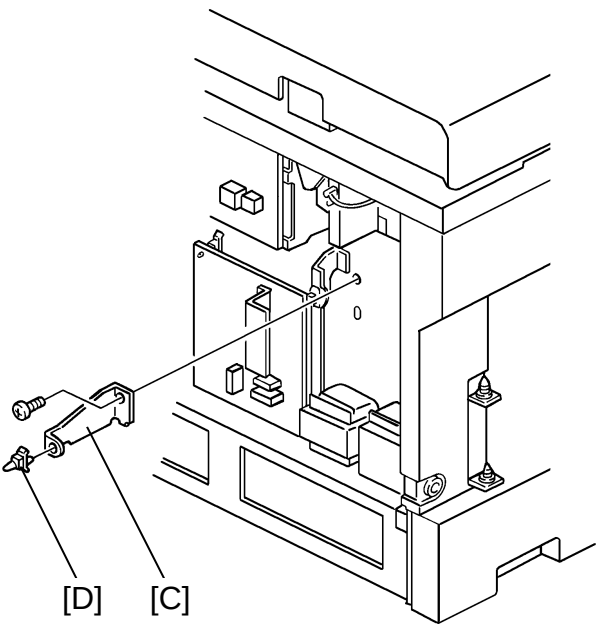
a. The heads [F] of three locking supports must correctly lock the main board and interface board together as shown.

b. The connector [G] of the interface board must be connected properly to the main board.

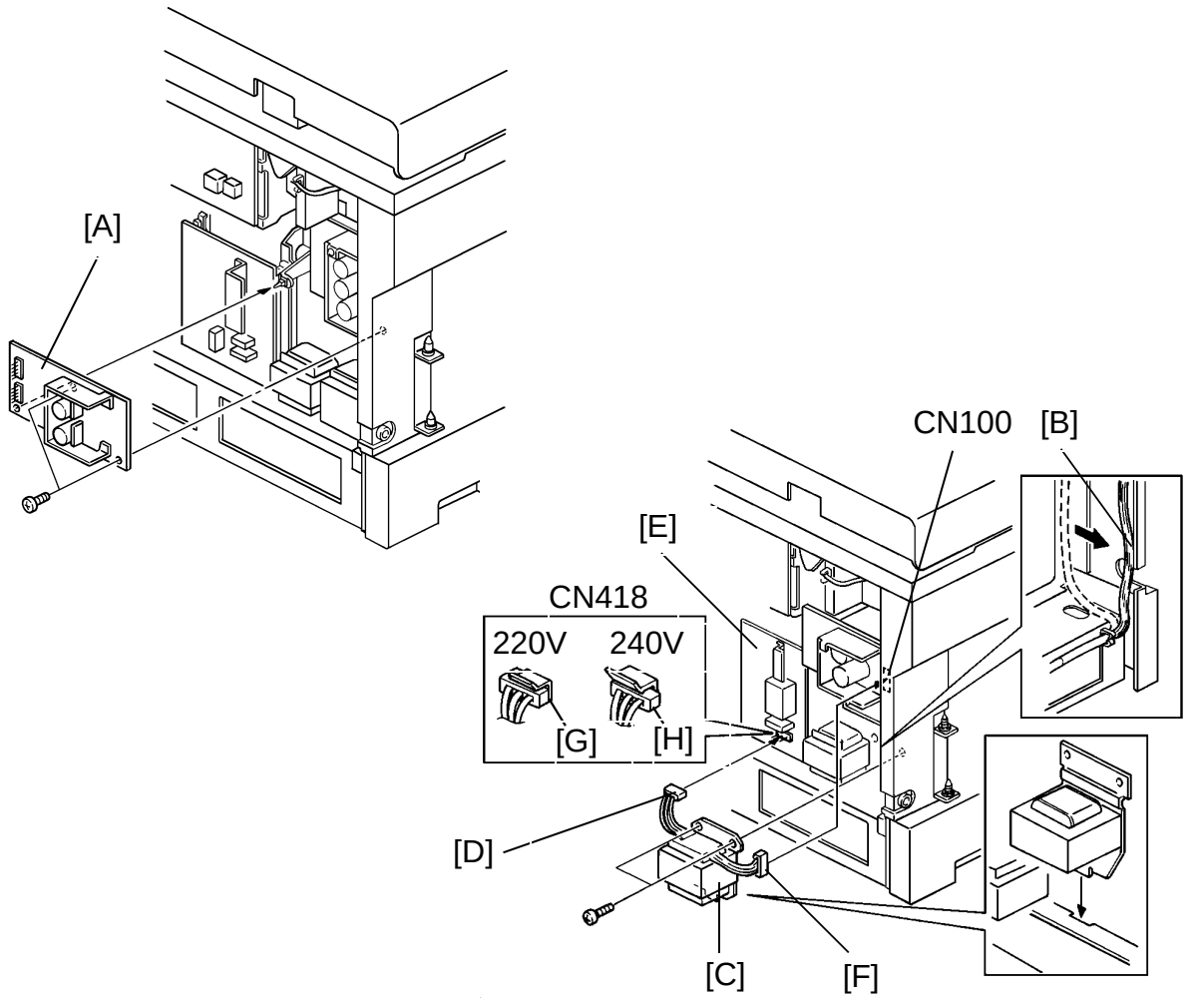
If erratic malfunction occurs, the memory of the RAM may be all set to zero. In this case, first you must clear all memory using SP Mode #99. Then, readjust the data of SP Modes #41, #42, #43, #44, #47, and #48.







4. Disconnect the connectors [A] from the main dc power supply unit [B] on the copier.
5. Remove the main dc power supply unit (2 screws and 2 locking supports).
6. Install the locking support bracket [C] on the rear frame (1 screw) and install the locking support (short) [D] on it.
7. Install the dc power supply unit bracket [E] on the main dc power supply unit as shown.
8. Reinstall the main dc power supply unit.
9. Re-connect the connectors [A] on the main dc power supply unit.



10. Install the optional dc power supply unit [A] (2 screws and locking support) as shown.

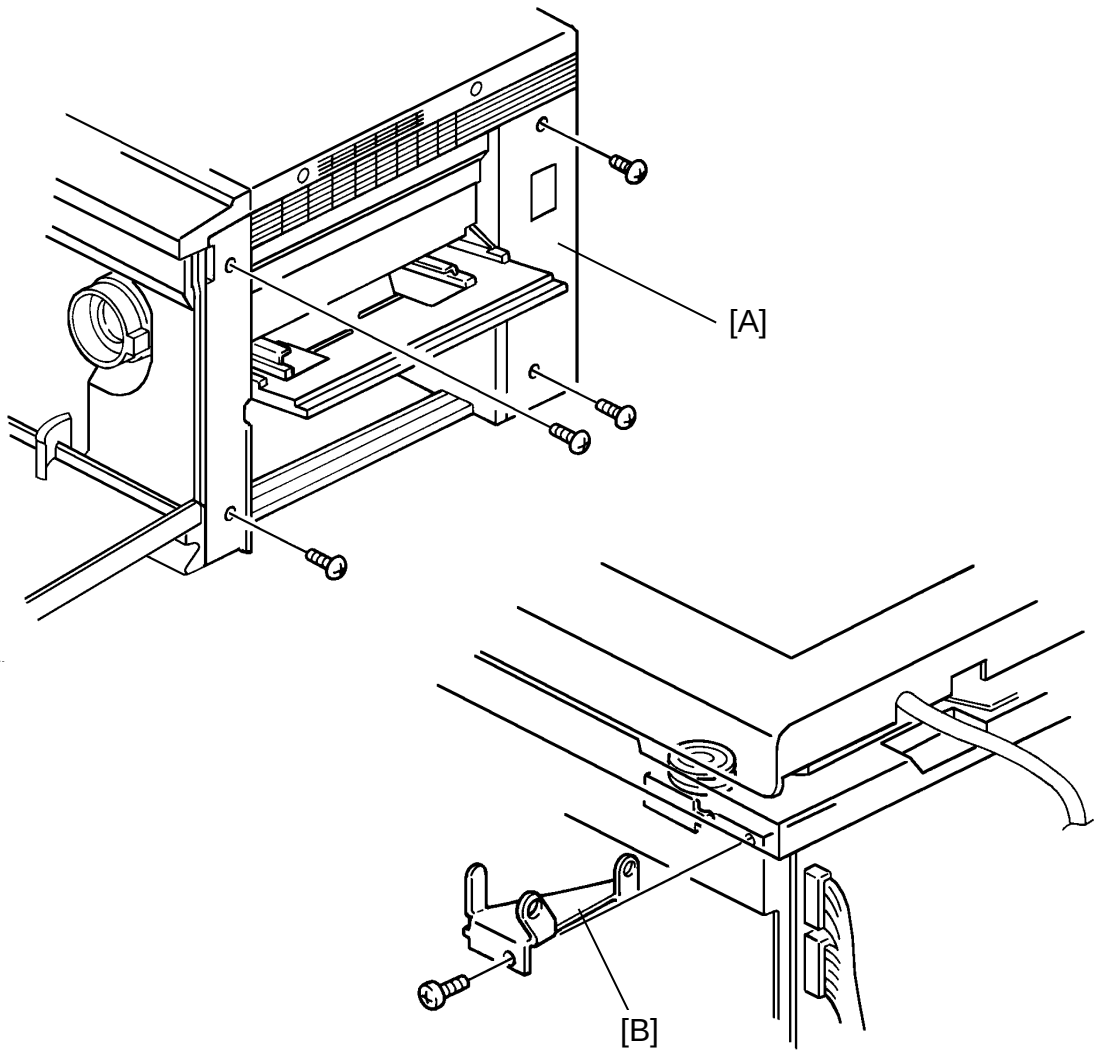
11. To prevent damage to the ac harness [B] when installing the optional transformer [C], reposition the harness as shown.

12. Install the optional transformer [C] (2 screws).

13. Connect the connector [D] (3P/Black) of the transformer to CN418 on the ac drive board [E] and the connector [F] (4P/White) to CN 100 on the optional dc power supply unit.

NOTE: 1. The transformer connectors of the transformer are positioned differently for the 220V and 240V machines.
In 220V machines, connect the connector [G] to CN418 as shown.
In 240V machines, connect the connector [H] to CN418 as shown.

2. Connect the optional dc harness. (See the installation procedure for each option.)



14. Open the front cover and manual feed table; then, remove the right side cover [A] (4 screws).

15. Install the harness support bracket [B] (1 screw) as shown.

SECTION 4
SERVICE TABLES

1. SERVICE TABLES

1.1 TEST POINTS

Copier Main Board

NUMBER	FUNCTION
TP101	GND
TP102	VCC (+5V)
TP103	ADS (Auto Image Density Sensor) Adjust the voltage to 2.5 ± 0.1 using VR101.)
TP104	GND
TP105	AVSS (GND)
TP106	GND
TP107	HT (23°C 96kΩ)
TP108	BIN (Development Bias Feed Back)
TP109	GIN (Grid Voltage Feed Back)
TP110	PSE (ID sensor voltage) Adjust the voltage to 4.0 ± 0.2 using VR102.
TP111	EXPO (Exposure Lamp Voltage)
TP112	GND
JP103	Key Counter (Cut this jumper wire when installing the key counter on the machine.)

DF Main Board

NUMBER	FUNCTION
TP102	+5V
TP103	GND
TP104	Factory Use
TP105	+12V
TP106	+24V
TP107	Factory Use

1.2 DIP SWITCHES

Copier Main Board

DIP SWITCH	NORMAL	FUNCTION
* 101-1	OFF	Free run
** 101-2	OFF	Forced start (Ready temperature by-passed) **Factory Use**
101-3	OFF	Clear counter and/or memory
101-4	OFF	Service program mode access

* When this switch is set to ON, the SP mode is disabled.
Free run starts when the Start key is pressed. To stop the free run, press the C/S key.

** The copy quality cannot be guaranteed if the fusing unit has not yet reached standard operating temperature.
To cancel this mode, turn off DIP SW 101-2, then turn the main switch on and off.
This mode must not be used in the field. The fusing and pressure rollers may be damaged when toner remaining on the rollers melts.

DF Main Board

DIP SWITCH 101				FUNCTION
1	2	3	4	
ON	OFF	OFF	OFF	* Normal
ON	OFF	OFF	ON	1 sided free run
OFF	ON	OFF	ON	2 sided free run
OFF	OFF	ON	ON	Solenoid test: Switch101 - solenoids ON Switch102 - solenoids OFF
ON	ON	OFF	ON	Motor test (lift switch must be ON)
ON	ON	ON	ON	All indicators ON

* The factory setting of DIP switch 101 is as follows:

101-1	101-2	101-3	101-4
ON	ON	OFF	OFF

This is because the DF is used on several different models. When the DF is used with this copier, DIP switch 101-2 must be turned off to increase the data transmission speed.

Duplex Main Board

DIP SWITCH	FACTORY SETTING	FUNCTION
700-1		Jogger Position Adjustment (0.5mm per step) Refer to the Data Table on the next page.
700-2		
700-3		
700-4		
700-5	OFF	**Factory Use**
700-6	OFF	
700-7	OFF	
700-8	OFF	

Data Table (Jogger Position Adjustment)

DIP SWITCH 700 (0:OFF, 1:ON)				ADJUSTMENT VALUE
1	2	3	4	
0	0	0	0	-3.5mm
1	0	0	0	-3.0mm
0	1	0	0	-2.5mm
1	1	0	0	-2.0mm
0	0	1	0	-1.5mm
1	0	1	0	-1.0mm
0	1	1	0	-0.5mm
1	1	1	0	±0
0	0	0	1	0.5mm
1	0	0	1	1.0mm
0	1	0	1	1.5mm
1	1	0	1	2.0mm
0	0	1	1	2.5mm
1	0	1	1	3.0mm
0	1	1	1	3.5mm
1	1	1	1	4.0mm

1.3 VARIABLE RESISTORS

Copier Main Board

NUMBER	FUNCTION
VR101	Adjusts ADS Voltage (2.5 ± 0.1)
VR102	Adjusts ID Sensor Voltage (4.0 ± 0.2)

Power Pack (CC/Grid/Bias)

NUMBER	FUNCTION
VRC	Adjusts Main Charge Current
VRG	Adjusts Standard Grid Voltage
VRB	Adjusts Standard Dev. Bias (Factory Use)

Power Pack (T&S)

NUMBER	FUNCTION
VRT	Adjusts Transfer Current
VRD	Adjusts Separation Current

AC Drive Board

NUMBER	FUNCTION
VR401	Factory Use

DF Main Board

NUMBER	FUNCTION
VR101	Factory Use
VR102	Original leading edge registration adjustment (One sided original mode)
VR103	Original leading edge registration adjustment (Two sided original mode)
VR106	Factory Use

2. SERVICE PROGRAM MODE

2.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data and change modes or adjustment values.

2.1.1 Service Program Access Procedure

There are two ways to access an SP mode.

(1) By key operation
(2) By turning on DIP switch 101-4 (on the main board)

All SP modes except for #27, #98, and #99 can be accessed by key operation. When accessing SP modes 27, 98, and 99, DIP switch 101-4 must be on. All SP modes can be accessed by turning on DIP switch 101-4.

Access Procedure 1 - Key Operation

1. Turn on the main switch.
2. Press the Clear Modes key
3. Press the Clear/Stop key.
4. Press the Enter key. "5" will blink in the copy counter and the ADS indicator or one of the Manual Image Density indicator LEDs will blink.
5. Enter the desired SP mode number using the numeral keys. The SP mode numbers are given in the Service Program table. The SP mode number can also be selected with the zoom key (+, –).

NOTE: To cancel an SP mode number after entering it, press the Clear/Stop key.

6. Press the Enter key while holding down the Point (".") key.

NOTE: a) If an invalid SP mode number is entered and the Enter key is pressed while pressing the Point key, the display on theoperation panel does not change.

b) With the following SP modes, press only the Enter key.
SP Mode numbers: #10, #11, #15, #17, #21, #34, #65, #66

7. To leave SP mode, press the Clear Modes key.

Access Procedure 2 - DIP switch 101-4

1. Turn the main switch off.
2. Remove the rear cover and turn on DIP SW 101-4, then turn on the main switch. "5" will blink in the copy counter and the ADS indicator or a Manual Image Density indicator LED will blink.
3. Using the numeric key board, enter the desired SP mode number. (SP mode numbers are given in the Service Program Mode table.) The SP program can also be selected with the zoom keys (+, –).

NOTE: To cancel an already entered program, press the Clear key.

4. Press the Enter key to view data.

NOTE: If an invalid SP number has been entered and the Enter key (#) is pressed, the display on theoperation panel does not change.

5. To leave SP mode, turn the main switch OFF, turn off DIP SW101-4, and turn the main switch on.

2.1.2 Change Adjustment Values or Modes

1. Follow steps 1-5 in access procedure 1 and steps 1-3 in access procedure 2.
2. The factory-set value or mode will be displayed in the Magnification indicator.
3. Enter the desired value or mode using the numeral keys. (SP mode numbers are given in the Service Program Mode table.)
4. To leave SP mode, press the Clear Modes key (access procedure 1) or turn off the main switch and DIP SW101-4 (access procedure 2).

2.1.3 Memory Clear Procedure

<SP-98 "Clears all counters">

Service Program SP-98 is used to clear all counters (copy counters, PM counter, self-diagnostic counters, misfeed counters). The procedure is as follows:

1. Turn off the main switch.
2. Turn on DIP SW101-3 & 4 on the main board and turn on the main switch.
3. Select Service program SP-98 and press the "1" key on the key pad, then press the Enter key.

   At this point all counters will be cleared to "0".
4. Turn off the main switch.
5. Turn off DIP SW101-3 and 4.
6. Turn on the main switch to resume normal copier operation.

NOTE: When the counters are cleared, the Magnification indicator will blink 4 times.

<SP-99 "Clear all memory">

This Service Program clears all counters as well as all adjustments and modes. All modes return to factory settings, and all adjustments returns to factory settings or defaults.

1. Turn off the main switch.
2. Turn on DIP SW 101-3 and 4 on the main board.
3. Turn on the main switch.
4. Select SP-99 and press the "1" key on the key pad, then press the Enter key to clear the memory.

NOTE: When the memory is cleared, the Magnification indicator will blink 5 times.

5. Turn off both the main switch and DIP SW101-3 and 4, then turn on the main switch to resume copier operation.

2.1.4 Others

In the following 13 SP modes, copies can be made by pressing the Start key:

SP Modes #5, #6, #8, #37, #41, #42, #43, #44, #47, #48, #52, #55, and #59

2.2 SERVICE PROGRAM MODE TABLE

* Copies can be made. (**Refer to NOTE 1.**)

Mode No.	Function	Data	Factory Setting	Comments
*5: Exposure Lamp OFF	Exposure lamp OFF Turn on DIP switch 101-1, then press the Start key to start free run. Press the C/S key to stop free run. Press the Enter key in Ready mode to turn off this mode.			Use this mode for the scanner movement check. To conserve toner, remove the development unit and disconnect CN123 on the main board before turning on the main switch.
*6: Jam Detection Off	Copies are made without jam detection. Press the Start key to make a copy. Press the Enter key in Ready mode to turn off this mode.			Use this mode to check whether the paper jam was caused by a jam sensor malfunction. The copy counter increments when copies are made in this mode.
8: Input Check	Displays the input from sensors and switches.	See comments		For data, see page 4-22.
9: Output Check	Electrical components turns on.	See comments		For data, see page 4-23.
10: Color Developer Initial Setting	Used to set the new color developer condition.			**Initial setting is required when new developer is installed.** After color developer conditioning (20 cycles) is completed, the copier automatically returns to normal mode.
*11: All Indicators ON	Turns on all the indicators on the operation panel			To turn off the indicators, press the Enter key.

Mode No.	Function	Data	Factory Setting	Comments
12: 220V/240V Conversion	Selects 220 or 240 volts.	0: 220V 1: 240V	0	If the rated voltage is 240V, this data must be changed to "1". **Refer to NOTE 2.**
15: Auto Reset Time	Selects auto reset of 1 or 3 minutes, or cancels this mode.	0: 1 min. 1: 3 min. 2: None		
16: Count Up/Down	Selects count up or count down.	0: Up 1: Down	0	
17: Auto Feed Station Shift	Selects auto feed station shift mode.	0: Auto Shift 1: Manual	0	Copier automatically shifts to the cassette or paper tray holding same size paper when paper runs out.
19: ADS Priority	Specifies whether the copier defaults to ADS or manual mode when the main switch is turned on.	0: ADS 1: Manual	0	
20: APS Priority (Copier)	Specifies whether the copier defaults to APS or manual mode when the main switch is turned on.	0: APS 1: Manual	0	This mode is used only on the A054 copier.
21: APS Priority (ADF)	Specifies whether the copier defaults to APS or manual mode when the original is set on the DF.	0: APS 1: Manual	1	DF must be installed on the machine.
22: SADF Shut-off Time	Selects shut-off time for SADF mode.	0: 5 sec. 1: 60 sec.	0	
23: ADF Free Size	Enables originals of various sizes to be fed from the same size stack.	0: No 1: Yes	0	
24: Factory Use				

Mode No.	Function	Data	Factory Setting	Comments
25: Margin Adjustment in Duplex Mode	Sets the margin (5 mm) on the right side of the reverse page.	0: Yes 1: No	0	Duplex must be installed on the machine. When 1 sided original mode is selected, the back margin (5 mm) is automatically added on the right side of the reverse page.
27: A3 (DLT) Double Counter	Selects single or double counter of the total counter in A3/DLT copies.	0: Normal 1: Double	0	
28: Sort Priority	Sort Mode is automatically selected when more than1 original is set on the DF table and the entered copy quantity is greater than 1 and less than 21.	0: Manual 1: Auto Sort	0	Sorter and DF must be installed on the machine. When in duplex mode, more than 2 originals must be set.
29: Fusing Temperature Control	Selects fusing temperature control mode.	0: ON/OFF control 1: Phase control	0	After selecting the control mode and turning the main switch off/on, the fusing temperature control is changed.
30: Black Toner Supply Mode	Selects black toner supply system.	0: Detect Mode 1: Fixed Mode	0	See SP 31/SP32 for toner supply amount.
31: Black Toner Supply Ratio (Detect Mode)	Determines how much toner is supplied in detect mode.	0: 15% 1: 7% 2: 30% 3: 60%	0	
32: Black Toner Supply Ratio (Fixed Mode)	Determines how much toner is supplied in fixed mode.	0: 7.0% 1: 3.5% 2: 10.5% 3: 14.0%	0	
33: ID Sensor Bias (Black)	Sets the bias voltage applied to the development roller for the image density check.	0: -260V 1: -220V 2: -280V 3: -300V	0	-260V = normal -220V = lighter -280V = darker -300V = darkest

Mode No.	Function	Data	Factory Setting	Comments
34: ADS Level	Selects the image density level in ADS mode.	0: Normal 1: Darker 2: Lighter	0	Data #1: Increases bias output (+40V). Lamp voltage is standard value. Data #2: Increases exposure lamp data (+4). Bias voltage is standard value.
35: Black Toner ID Detection	ID sensor check is performed every 5 copies or 10 copies.	0: 10 copies 1: 5 copies	0	If low image density occurs in the near end condition, change the data to "1".
*37: Black Bias Adjustment	Adjusts black bias output if the image density at level 4 cannot be adjusted in Light Intensity mode (SP 48).	0: V_0 1: V_0+40V 2: V_0+20V 3: V_0 - 20V 4: V_0 - 40V	0	V_0 = Standard Bias 0: Normal 1: Darkest 2: Darker 3: Lighter 4: Lightest
*41: Lead Edge Erase Margin Adjustment	Adjusts the lead edge erase margin.	0 – 15	0 –15 Default = 8	0.5 mm per step. (max. - 4.0 mm to +3.5mm)
*42: Registration Adjustment	Adjusts registration.	0 – 15	0 –15 Default = 8	0.5 mm per step. (max. -4.0 mm to +3.5mm)
*43:Vertical Magnification Adjustment	Adjusts magnification in the paper travel direction.	0 – 15	0 –15 Default = 8	0.2% per step. (max. -1.6% to +1.4%)
*44: Horizontal Magnification Adjustment	Adjusts magnification perpendicular to the direction of paper travel.	0 – 15	0 –15 Default = 8	0.2% per step. (max. -1.6% to +1.4%)
*47: Focus Adjustment	Adjusts the 4th/5th mirror position to correct focus.	0 – 15	0 –15 Default = 8	This mode must be done after vertical and horizontal magnification adjustment (SP Mode #43 and 44).

Mode No.	Function	Data	Factory Setting	Comments
*48: Light Intensity Adjustment	Adjusts the exposure lamp voltage.	100 – 150	100 –150 Default = 126	The exposure lamp voltage is adjusted on the production line. (The factory setting is different for each machine. When clearing all memory, the data of this mode returns to "126".
49: Fusing Temperature Adjustment	Adjusts fusing temperature.	175 – 190°C	185°C	175 to 190°C in 1°C steps. If a number over 190 is input, the CPU sets the temp. at 190°. If under 175, 175° is set.
51: Exposure Lamp Voltage Display	Displays the exposure lamp voltage with a reference number.			The exposure lamp, main motor, and optics cooling fans turn on for 10 seconds when the Enter key is pressed. Press the C/S key to turn this mode off. Do not repeat more than 5 times to avoid overheating the optics cavity.
*52: Fusing Temperature Display	Displays the fusing temperature.			
54: Vsg Adjustment	Adjusts Vsg.			Adjust Vsg to 4.0 ± 0.2 using VR102 on the main board. The main motor and the ID sensor LED turn on when the Enter key is pressed. The Vsg voltage is displayed on the magnification indicator.

Mode No.	Function	Data	Factory Setting	Comments
*55: Vsg & Vsp Check	Display the Vsg and Vsp readings. The Vsg reading is displayed while the "0" key is held down. To stop this mode, press the C/S key.			The Vsp and Vsg voltage readings are updated every 10 or 5 copies (ID sensor timing).
56: ADS Voltage Adjustment	Adjusts ADS.			After adjusting the light intensity, place 6 or more sheets of A3 (LDG) white paper on the exposure glass and select this mode. Adjust ADS voltage to 2.5 ± 0.1 using VR101 on the main board.
*59: Bias Voltage Check	Displays bias voltage. Press the Start key to display the bias voltage. Press the C/S key to stop.			
61: Drum Wear Compensation Setting	Selects the drum wear compensation value.	0: 1/10h 1: 1/20h	0	3
62: ID Sensor Grid Voltage Setting	**Factory Use (The data must be "7".)**			
63: Toner Supply Unit Initial Setting	Used to supply toner from the toner cartridge to the toner hopper.			Initial setting must be done when the machine is installed and when the toner supply unit is replaced.
64: Black Toner Density Level Display	Displays the black toner density level detected by initial setting (SP #65)	0 1 2 3 4		Data Vsp/Vsg(%) 0 12 – 15 1 0 – 7 2 8 – 11 3 16 – 21 4 22 –

Mode No.	Function	Data	Factory Setting	Comments
65: Black Developer Initial Setting	Sets the data value corresponding to the Vsp/Vsg ratio for new black developer. "20" is displayed on the copy counter when the Enter key is held down. Press the Start key to start the initial setting. Vsg is displayed when the "0" key is held down.			**Initial setting must be done when new developer is installed.** The CPU monitors Vsg and Vsp for copies 11 to 18 of the free run. Vsp is displayed on the magnification indicator. The copier automatically returns to normal mode after initial setting is completed.
66: Drum Initial Setting	Used to set new drum condition.			**Initial setting must be done when a new drum is installed.** The OPC counter is cleared.
67: Vr Correction Ratio	Displays L values (Vr correction ratio).			L = Vrp/Vsg x 100
68: Vr Forced Detection	Detects Vrp and perform Vr correction.			1. Turn off the DIP SW 101-4 if it is on. 2. Make 5 copies.
69: OPC Counter	Shows the total number of copies made with the drum installed on the machine.			The first three digits are displayed in the magnification indicator when the Enter key is pressed. Press the "." key to display the second three digits.
70: Color Toner Supply Ratio (Fixed Mode)	Selects the color toner supply ratio.	0: 14% 1: 7% 2: 21% 3: 28%	0	This mode is available only when the color unit is installed.
71: Sorter Operation	Enables sorter operation.	0: No 1: Sorter (1) 2: Sorter (2)	0	**NOTE 3**

<table>
<tr><th>Mode No.</th><th>Function</th><th>Data</th><th>Factory Setting</th><th>Comments</th></tr>
<tr><td>73: Color Copy Counter</td><td>The Magnification indicator displays the total number of color copies (Red + Green + Blue).</td><td></td><td></td><td>The first three digits are displayed in the magnification indicator when the Enter key is pressed.
Press the "." key to display the second three digits.</td></tr>
<tr><td>74: Color Toner ID Detection</td><td>ID sensor check is performed every 5 copies or 10 copies.</td><td>0: 5 copies
1: 10 copies</td><td>0</td><td>Normally, "0" should be selected for color toner.</td></tr>
<tr><td>75: ID Sensor Bias (Color Toner)</td><td colspan="3">Selects the bias voltage applied to the bias roller when sensing image density.

<table><tr><th>Data</th><th>Red</th><th>Blue</th><th>Green</th></tr><tr><td>0
1
2
3</td><td>–240 V
–200 V
–260 V
–280 V</td><td>–300 V
–260 V
–320 V
–340 V</td><td>–320 V
–280 V
–340 V
–360 V</td></tr></table>
0: Normal 1: Lighter
2: Darker 3: Darkest</td><td></td></tr>
<tr><td>76: Sorter Bin Capacity</td><td>Sets the stack quantity limit.</td><td>0: No Limit
1: Limit</td><td>1</td><td></td></tr>
<tr><td>77: ADF Odd Number Originals (Duplex Mode)</td><td>Sets the copier to eject the final copy if an odd number of originals are set.</td><td>0: On
1: Off</td><td>0</td><td>When on, the final sheet is fed out; when off, the sheet stays in the duplex tray.</td></tr>
<tr><td>*79: Color Bias Adjustment</td><td>Adjusts color bias output if the image density at level 4 cannot be adjusted in Light Intensity mode (SP 48).</td><td>0: V_0
1: V_0+40V
2: V_0+20V
3: V_0 – 20V
4: V_0 – 40V</td><td></td><td>V_0 = Standard Bias
0: Normal
1: Darkest
2: Darker
3: Lighter
4: Lightest</td></tr>
<tr><td>80: Red Toner Density Level Display</td><td>Displays the red toner density level detected by initial setting (SP #10).</td><td></td><td></td><td>Toner Density Level = Vsp/Vsg x 100</td></tr>
<tr><td>81: Green Toner Density Level Display</td><td>Displays the green toner density level detected by initial setting (SP #10).</td><td></td><td></td><td>Toner Density Level = Vsp/Vsg x 100</td></tr>
</table>

Mode No.	Function	Data	Factory Setting	Comments
82: Blue Toner Density Level Display	Displays the blue toner density level detected by initial setting (SP #10).			Toner Density Level = Vsp/Vsg x 100
87: PM Interval Setting	Sets the interval of the PM counter.	0: No PM 1: 40K 2: 60K 3: 80K 4: 100K	0	
88: PM Counter Display	The first three digits are displayed in the magnification indicator when the Enter key is pressed. Press the "." key to display the second three digits.			Displays contents of the PM counter. When the PM counter is exceeded, the Magnification indicator blinks.
89: PM Counter Reset	Resets the PM counter.	1 (**NOTE 4**)		Use this mode after performing PM.
93: Maximum Copy Quantity	Limits the maximum copy quantity that can be entered.	1 – 99	99	
98: Clear Counters	Clear the following counters: • Copy Counters • SC Counters • Jam Counters • PM Counter	0: No 1: Yes		DIP switches 101-3 and 4 on the main board must be on.
99: Clear All Memory	Clear all counters and returns all modes to the factory setting.	0: No 1: Yes		DIP switches 101-3 and 4 on the main board must be on.

Mode No.	Function	Data	Factory Setting	Comments
100:First Station Copies	Displays the total number of copies fed from the first feed station (cassette and manual feed table).		0	The first three digits are displayed in the magnification indicator when the Enter key is pressed. Press the "." key to display the second three digits. SP mode #102 is used only on the A054 copier. SP mode #103 and #104 are not used.
101: Upper Paper Tray Copies	Displays the total number of copies fed from the upper paper tray.		0	
102: Lower Paper Tray Copies	Displays the total number of copies fed from the lower paper tray.		0	

Mode No.	Function	Data	Factory Setting	Comments
105:Duplex Copies	Displays the total number of copies made in duplex mode.		0	The first three digits are displayed in the magnification indicator when the Enter key is pressed. Press the "." key to display the second three digits.
106:DF Originals	Displays the total number of originals fed from the DF.		0	
120:Service Calls (total)	Displays the total number of times the service call indicator has turned on.		0	
121:Optics Section Service Calls	Displays the total number of service calls involving the optics section.		0	
122:Exposure Lamp Service Calls	Displays the total number of service calls involving the exposure lamp.		0	
123:	Not used			
124:Fusing Section Service Calls (E53 and 54)	Displays the total number of service calls involving the fusing unit.		0	
125:Service Calls for Interface Comunication	Displays the total number of "Interface Communication" service calls between the copier and duplex tray.		0	
130:Misfeeds(total)	Displays the total number of paper misfeeds.		0	

Mode No.	Function	Data	Factory Setting	Comments
131:Number of Misfeeds by Location	Display the total number of paper misfeeds for each area.		0	"1" will be indicated in the copy counter when the Enter key is pressed. Press the Zoom keys ("+" or "–") to select the following numbers: 1: Paper Feed 2: Exit 3: Sorter 4: DF 5: Duplex

NOTE 1: After an SP mode is selected, the copier goes automatically into copy mode when data is changed (SP modes 37, 41-44, 47-48) or when the Enter key is pressed (SP modes 5, 6, 11, 52, 59, 79). To make a copy after changing data in SP mode, press the Start key. If you do not wish to make a copy after changing data, press the Enter key. "5" will blink in the copy counter and you can select another SP mode.

NOTE 2: Connectors CN418 and CN421 must be repositioned and the data in SP Mode #12 must be changed when the copier is installed in a 240V area.

NOTE 3: The following functions can be selected in SP Mode #71:

Data	Function
0	1. Sort/stack mode can only be selected when the sorter is closed. 2. In Sort/stack mode, user code #4 is displayed when the sorter is opened.
1	User code #4 is displayed whenever the sorter is opened.
2	1. In Sort/stack mode, user code #4 is displayed when the sorter is opened. 2. Sort/stack mode can be selected even if the sorter is open. User code #4 is displayed when Sort/stack mode is selected.

NOTE 4: How to clear the PM counter

1) Enter "89", then press the Enter key.
2) Enter "1" to clear the PM counter, then press the Enter key.

2.3 SP-8 SENSOR/SWITCH DATA CHECK

- How to check sensor/switch data -

1. Press "8", then press the Enter (#) key while pressing the Point key.
2. With the numeral keys, enter the desired input number. The input numbers are given in the following table.
3. Press the Enter (#) key again.
4. Enter the number of copies and press the Start key.
5. The data (0 or 1) will be displayed in the magnification indicator.

NOTE: The ON/OFF status can also be checked manually.

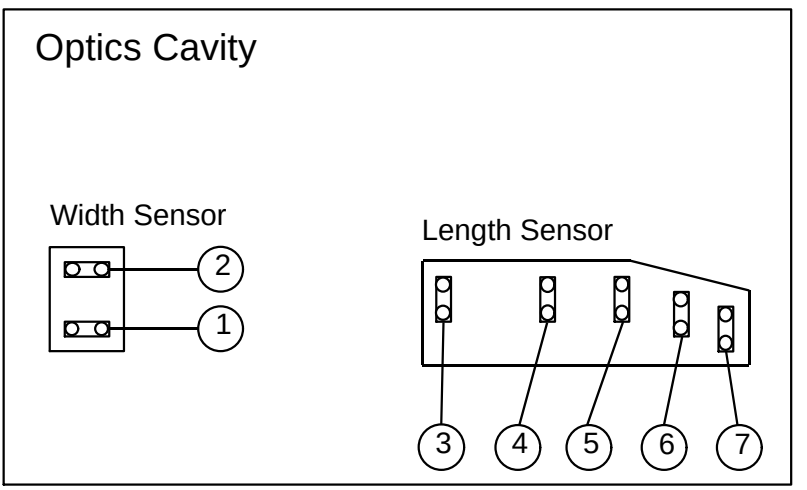
Input No.	Sensor/Switch/Signal	Data	
		0	1
1	Registration Sensor	Paper not detected (HIGH)	Paper detected (LOW)
2	Exit Sensor		
3	Cassette Lift Sensor	Casssette lift arm down (HIGH)	Cassette lift arm up (LOW)
4	1st Paper End Sensor	Paper end detected (HIGH)	Paper detected (LOW)
5	2nd Paper End Sensor		
6	3rd paper End Sensor (**used only on the A054 copier**)		
9	Manual Feed Table Switch	Table closed (HIGH)	Table open (LOW)
10	Right Cover Switch (**used only on the A048 copier**)	Cover closed (HIGH)	Cover open (LOW)
11	Right Cover Switch (**used only on the A054 copier**)		
14	Relay Sensor (**used only on the A054 copier**)	Paper not detected (HIGH)	Paper detected (LOW)
17	Scanner HP Sensor	OFF (LOW)	ON (HIGH)
18	Lens HP Sensor		
19	4th/5th Mirror HP Sensor		
20	Toner End Sensor	ON (HIGH)	OFF (LOW)
21	Toner Overflow Sensor	Used toner holder full (HIGH)	Used toner holder not full (LOW)
22	Color 1 Switch	Color development unit installed.	Black development unit installed.
23	Color 2 Switch		
24	Duplex Entrance Sensor	Paper not detected (HIGH)	Paper detected (LOW)
25	Duplex Turn Sensor		
26	Duplex Paper End Sensor		
27	Duplex Jogger HP Sensor	OFF (LOW)	ON (HIGH)
28	Sorter Paper Sensor	Paper not detected (HIGH)	Paper detected (LOW)
29	Sorter Wheel switch	Switch is off.	Switch is on.
30	Sorter HP Switch	Switch is on.	Switch is off.
31	Sorter Switch	Sorter opened	Sorter closed

Input No.	Sensor/Switch/Signal	Data	
		0	1
32	ADF ON Line	ADF not installed	ADF installed
33	ADF Lift Sensor	ADF closed	ADF opened
34	APS Sensors	Refer to the following explanation	

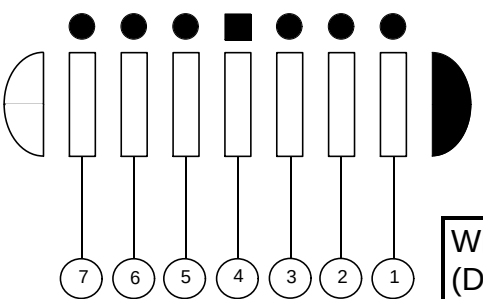
Input No. 34

The A054 Copier has 7 different sensors for detecting the original length and width in APS mode. The platen cover position sensor (DF position sensor) and the platen cover closed sensor are used for the original size detection timing.

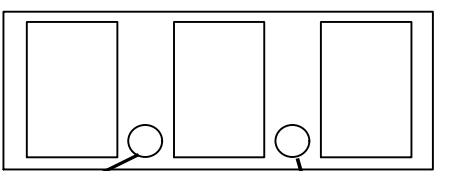
1) When an original length sensor or an original width sensor detects the original, the manual image density indicator (7 LEDs) corresponding to the sensor will light.
   Original detected Original not detected
2) When the platen cover position sensor and/or the platen cover closed switch are turned on, the point indicator in the magnification ratio indicator will light.
   Sensor/Switch ON Sensor/switch OFF



1) Manual Image Density Indicator



2) Magnification Ratio Indicator



When platen cover (DF) position sensor turns on, this point indicator will light.

When the platen cover closed switch turns on, the point indicator will light.

2.4 SP-9 ELECTRICAL COMPONENT CHECK

- How to turn electrical components on/off -

1. Enter "9", then press the Enter (#) key while pressing the Point key.
2. Enter the desired output number. (See the following table.)
3. Press the Start key to turn on the electrical component.
4. Press the Clear/Stop key to turn off the electrical component.

CAUTION: To prevent the paper lift gear and sector gear from being damaged, remove the first cassette before turning on the lift clutch solenoid (No. #27).

Output No.	Electrical Component
1	Main Motor (PTL and Quenching Lamp)
2	Charge Corona + Standard Grid (Grid Voltage = –920 volts)
3	Charge Corona + ID Sensor Grid (Grid Voltage = –660 volts + Vp Correction Factor)
4	Charge Corona + Vrp Grid (Grid Voltage = –500 volts)
5	Transfer Corona (One sided copy)
6	Transfer Corona (Two sided copy)
8	Separation Corona
9	ID Sensor LED
10	Development Drive Clutch
11	Toner Supply Clutch Solenoid
14	Sorter DC Motor
15	Sorter Wheel Motor (Bin up)
16	Sorter Wheel Motor (Bin down)
17	Registration Clutch
18	1st Paper Feed Clutch Solenoid
19	Relay Roller Clutch Solenoid
23	2nd Paper Feed Clutch Solenoid
24	3rd Paper Feed Clutch Solenoid (**used only on the A054 copier**)
27	Cassette Lift Clutch Solenoid
28	Duplex Gate Solenoid (Paper tray must be inserted.)
29	Pick-up Roller Release Solenoid
30	Duplex Feed Motor (Stack) (Paper tray must be inserted.)
31	Duplex Feed Motor (Feed) (Paper tray must be inserted.)
32	Duplex Jogger Motor (Home Position) (Paper tray must be inserted.)
33	Duplex Jogger Motor (A4 size) (Paper tray must be inserted.)
34	Duplex Jogger Motor (B5 size) (Paper tray must be inserted.)
35	Duplex Jogger Motor (LT size) (Paper tray must be inserted.)

Output No.	Electrical Component
37	Erase Lamp
39	Optics Cooling Fans
40	Exposure Lamp + Optics Cooling Fans
42	Charge Corona + Standard Grid + Transfer Corona + Separation Corona
43	Charge Corona + ID Sensor Grid + Transfer Corona + Separation Corona
44	Charge Corona + VR Grid + Transfer Corona + Separation Corona
50 - 57	Applies bias voltage in 40V steps starting at 120V
60 - 67	Applies grid voltage in 60V steps starting at 560V

NOTE: Disconnect the duplex entrance sensor connector before using SP Mode #9-30 to check the duplex tray paper path. Otherwise, RA401 on the ac drive board will turn on and off (the misfeed indicator blinks) whenever the entrance sensor is actuated by a paper sheet.

2.5 MISFEED TABLE

2.5.1 Number of PaperJams (SP Mode #131)

The following explains how to access a record that gives the number of paper jams by copier location.

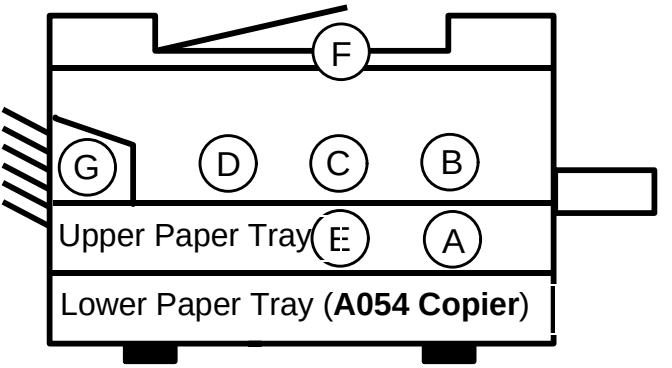
1. Enter "131" with the numeric keys.
2. Press the Enter (#) key while pressing the Point key.
3. Select the desired FC code (Function Code).

   The FC code can also be selected with the "+" and "–" (zoom "up" and "down") keys.
4. Hold down the "." key to display the jam counter in the second three digits of the Magnification indicator.

   Release the "." key to display the first three digits.

FC Code	Jam Area/Detection
1	Paper Misfeed Jam (Registration Sensor Not ON)
2	Exit Jam (Exit Sensor Not ON or OFF)
3	Sorter Jam (Sorter Paper Sensor Not ON or OFF)
4	DF Jam (DF Sensors Not ON or OFF)
5	Duplex Jam (Entrance Sensor Not ON, Turn Sensor not ON or OFF in Stack Mode, Registration Sensor Not ON in Feed Mode)

2.5.2 Paper Misfeed Location Indicator



1. Initial Misfeed

Misfeed location indicators turn on if paper is detected by sensors when the main switch is turned or when the front cover/exit cover is closed. Sensors and indicators are listed below.

ITEM NO.	SENSOR		MISFEED LOCATION INDICATOR
1	Registration Sensor	Using cassette or manual feed table	B and C light
		Using upper or lower paper tray (**NOTE 2**)	A and C light
		Using duplex tray	A and C light
2	Exit Sensor		D lights
3	Sorter Paper Sensor		G lights
4	Duplex Entrance Sensor		E lights
5	Duplex Turn Sensor		A lights

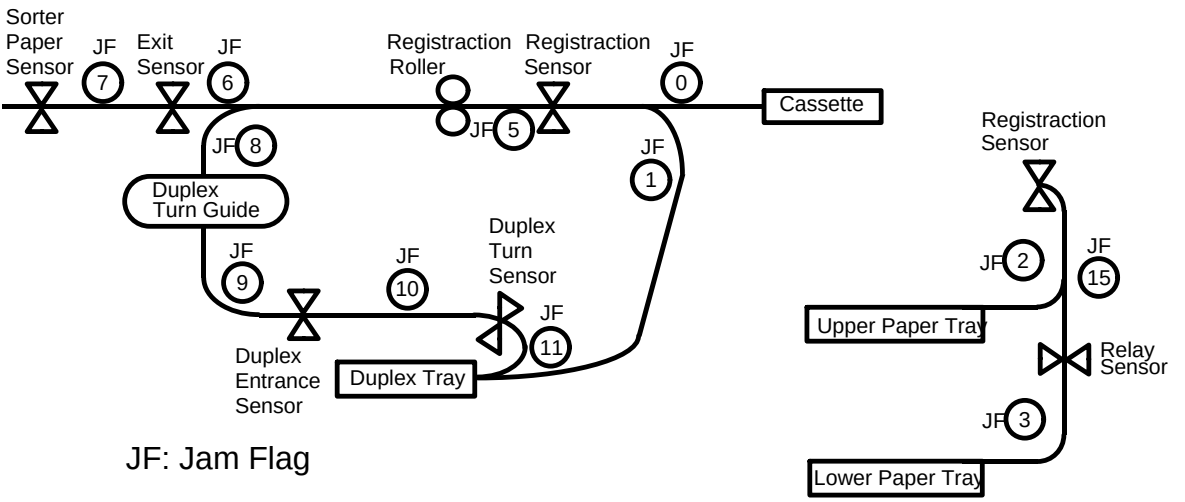
2. Misfeed during copy cycle (Misfeed Detection)

A paper misfeed indicator starts blinking to indicate that a paper jam has been detected during the copy cycle. Sensors and indicators are listed below.

ITEM NO.	SENSOR		MISFEED LOCATION INDICATOR
1	Registration Sensor Not ON (ON check jam)	Using cassette or manual feed table	B blinks
		Using upper or lower paper tray (**NOTE 2**)	A blinks
		Using duplex tray	A blinks and E lights
2	Exit Sensor Not ON (ON check jam)		D blinks
3	Sorter Paper Sensor Not ON (ON check jam)		G blinks
4	Duplex Entrance Sensor Not ON (ON check jam)		D blinks
5	Duplex Turn Sensor Not ON (ON check Jam)		E blinks
6	Exit Sensor Not OFF (OFF check jam)		D blinks
7	Sorter Entrance Sensor Not OFF (OFF check jam)		G blinks
8	Duplex Turn Sensor Not OFF (OFF check jam)		E blinks
9	Registration Sensor Not ON (ON check jam) (**NOTE 2**)		C blinks

3. Misfeed during copy cycle (Misfeed Location)

1. The misfeed location indicator turns on (and stays lit) to indicate the location of a misfeed detected by a sensor during the copy cycle.
2. The CPU determines the position of the copy leading edge by checking jam flags "0" through "15". The CPU then turns on the misfeed location indicator.



JF: Jam Flag

ITEM NO.	SENSOR	MISFEED LOCATION INDICATOR
Misfeed location detected by sensor		
1	Registration Sensor ON	C lights
2	Exit Sensor ON	D lights
3	Sorter Paper Sensor ON	G lights
4	Duplex Entrance Sensor ON	E lights
5	Duplex Turn Sensor ON	E lights
6	Relay Sensor ON (**NOTE 2**)	A lights
Misfeed location detected using jam flags		
7	Jam Flag "0" ON	B lights
8	Jam Flag "5", "6", or "8" ON	C lights
9	Jam Flag "7" or "9" ON	D lights
10	Jam Flag "10" or "11" ON	E lights
11	Jam Flag "2", "3", or "15" ON (**NOTE 2**)	A lights
12	Jam Flag "1" ON	E and A light

NOTE1: 1. If the misfeed location indicator is blinking and a misfed sheet is detected under the corresponding sensor, the indicator continues to blink. (Normally, the indicator stays lit to indicate the misfeed location.)

2. If a paper misfeed is detected by the registration sensor ON check during a multi-copy run, the misfeed location indicator turns on after copies that began the copy cycle before the paper jam are completely feed out from the copier.

3. If an original misfeed occurs in the DF, the misfeed indicator "F" blinks.

NOTE2: The A054 copier has an additional feed station: the lower paper tray. When the lower paper tray is in use, the following apply:

1. The misfeed location "A" and "C" indicators will light if the registration sensor turns ON during the check for an initial misfeed**.**

2. The misfeed location "A" indicator will blink if the relay sensor does not turn on during the copy cycle.

3. During the copy cycle, the misfeed location "C" indicator will blink if the registration sensor does not turn on after the relay sensor turns on.

4. The misfeed location "A" indicator will light if the relay sensor detects a paper misfeed.

5. Jam flags "3" and "15" have been added for the 2nd paper tray misfeed condition check.

2.6 SERVICE CALL AND USER CODE TABLE

SERVICE CALL CODE

E-CODE	CONTENTS	SP Mode No. (SC Counter)
11	**Exposure Lamp Error** The feed back signal beomes higher than 4.2 volts (r.m.s) for 1.0 second when the exposure lamp is on, or it becomes higher than 1.0 volt (r.m.s) for 1.0 second when the exposure lamp is off.	SP Mode #122 (Exposure Lamp)
12	**Exposure Lamp Error** The feed back signal falls below 0.5 volt (r.m.s) for 1.0 second when the exposure lamp is on, or the exposure lamp stays on for longer than 10 seconds.	
13	**Zero Cross Signal Error** The CPU does not receive the zero cross signal within 0.56 second.	–
21	**Scanner Home Position Error** The scanner home position sensor remains off (LOW) 8 seconds after the main switch is turned on.	SP Mode #121 (Optics)
22	**Scanner Home Position Error** The scanner home position sensor still on (HIGH) 1.0 second after the scanner starts.	
28	**Lens Home Position Error** The lens home position sensor remains off (LOW) 3.5 seconds after the lens move to the home position.	
29	**Lens Home Position Error** The lens home position sensor is still on (HIGH) 3.5 seconds after the lens leaves the home position.	
2A	**4th/5th Mirror Home Position Error** The 4th/5th mirror home position sensor is still on (HIGH) 2.5 seconds after the 4th/5th mirror assembly moves to the home position.	
2B	**4th/5th Mirror Home Position Error** The 4th/5th mirror home position sensor is still off (LOW) 2.5 seconds after the 4th/5th mirror assembly leaves the home position.	
52	**Fusing Warm-up Error** The temperature detected by the thermistor does not reach 175 °C within 100 seconds after the main switch is turned on.	SP Mode #124 (Fusing Section) **Refer to NOTE b)**
53	**Fusing Overheat** The temperature detected by the thermistor becomes higher than 240 °C.	
55	**Fusing Thermistor Open** The temperature detected by the thermistor does not reach 2 °C within 30 seconds after the main switch is turned on.	

E-CODE	CONTENT	SP Mode No. (SC Counter)
70	**Toner Overflow Sensor ON** When the toner overflow sensor is on, "E70" blinks in the magnification indicator. Up to 250 copies additional can be made. After 250 copies are made, "E70" lights and copies cannot be made.	—
80	**Duplex and Copier Main Board Communication Error** The copier main board does not receive any signal from the duplex main board.	SP Mode #125 (Interface Comunication)
81	**Interface Board Error** The interface board is not connected when the duplex unit is installed.	
82	**Jogger Home Position Error** The output of the jogger home position sensor remains LOW as the duplex main board is driving the jogger fences outward.	
83	**Jogger Home Position Error** The output of the jogger home position sensor remains HIGH as the duplex main board is driving the jogger fences inward.	^

NOTE: a) E-codes (E1 to E8) are displayed in the copy counter. To display the two digits, press the Enter key.

Example:
When the machine detects the E11 condition, E1 is displayed in the copy countrer. Hold down the Enter key, and "11" is displayed in the copy counter.

b) When the service call (E5) conditions occur, for safety reason they cannot be cleared by turning off/on the main switch. The following procedure must be performed to clear these service call conditions:

1. Turn on the main switch.
2. Turn DIP switch 101-1 on and off.
3. Turn the main switch off and on.

USER CODE

U-CODE	CONTENTS
1	Right Cover Open
2	Key Counter Not Set
3	Development Unit Not Set
4	Sorter Open
5	Cassette Lift Sensor Not ON (Cassette is not properly set.)

3. SERVICE REMARKS

3.1 GENERAL CAUTION

To prevent physical injury, keep hands away from the mechanical drive components in the following two cases:

a. If the Start key is pressed before the copier finishes the warm-up cycle, (Ready indicator starts blinking) the copier starts making copies as soon as the warm-up cycle is completed.
b. If the main switch is turned on while the first cassette is in the down position, the main motor starts rotating as soon as the warm-up period is completed.

3.2 DRUM

1. Never touch the drum surface with bare hands.
2. Store the drum in a cool dry place.
3. Always wear gloves when cleaning the drum.
4. Do not leave the drum exposed to light for long periods of time.
5. Drum Initial Setting (SP No. 66) must be done after installation of a new drum.

NOTE: Drum initial setting does not need to be done when a new machine is installed; this is done at the factory.

6. Always keep the drum in the protective sheet when inserting or pulling the drum out of the copier. This protects the drum from light, thus preventing drum fatigue.
7. Before inserting or pulling out the drum, do the following to prevent drum damage:
    a) Remove the cleaning unit.
    b) Remove the development unit.
    c) Remove the charge corona unit.
    d) Lower the transport unit.
8. Before pulling out the drum, place a sheet of paper under the drum to catch any dropped toner.
9. Dispose of used drums according to local regulations.

3.3 CHARGE CORONA

1. Clean the corona wire by sliding the corona unit in and out. (The cleaner pads come into contact with the corona wire when the corona unit is slid all the way out.) The wire and casing can also be cleaned with alcohol or water. Do not use sandpaper or a solvent.
2. Do not touch the corona wire with oily hands. Oil stains may cause white bands on copies.
3. Make sure that the corona wire is correctly positioned between the cleaner pads and that there is no foreign material (iron filings, etc.) on the casing.
4. When installing a new corona wire, be sure to place the damper ring in the front end block. (See Charge Corona Wire Replacement.)
5. When adjusting the drum current, always make sure that the axis of the drum shoe is aligned with the corona wire.
6. Clean the charge grid with a blower brush (not with a cloth).
7. The corona height should only be adjusted in the following two cases:

    a) When the front end block is replaced
    b) When the drum charge current is uneven

3.4 OPTICS

1.The following parts are very difficult to adjust. Do not adjust them.

    a) 4th/5th Mirror Home Position Sensor
    b) Lens Home Position Sensor
    c) Lens and 4th/5th Mirror Guide Rails

2. Before removing a sensor bracket to replace a sensor, mark the position of the bracket. Check the copy image (magnification and focus) to determine the exact location of the sensor.
3. Do not bend or damage the lens/scanner support plate or the mylar strip.

4. Clean the following parts with a silicone cloth:

   Lens and 4th/5th Mirror Guide Rails
   1st Scanner Guide Plate

5. Clean the exposure glass with glass cleaner and a dry cloth to reduce the amount of static electricity on the glass surface.
6. Only used water or a silicone cloth to clean the mirrors.
7. Do not touch the following parts with bare hands:

   Reflectors
   Exposure Lamp
   Mirrors and Lens

8. Do not bend the exposure lamp flat cables at sharp angles.
9. After adjusting the light intensity (SP No.48), check and adjust the following items:

   a) ADS Voltage (SP No.56)....2.5 ± 0.1V
   b) Vsg (SP No.54).... 4.0 ± 0.2V

3.5 DEVELOPMENT UNIT

1. Be careful not to nick or scratch the development roller sleeve.
2. Place the development unit on a sheet of paper after removing it from the copier.
3. Be careful not to bend the bias terminals.
4. Clean the drive gears after removing used developer.
5. Never load black developer or toner into the color development unit; never load color developer or toner into the black development unit.
6. Developer initial setting is necessary when the developer is replaced, or when a new color development unit is installed.

   a) Black Developer Initial Setting (SP No.65)
   b) Color Developer Initial Setting (SP No.10)

8. Dispose of used developer according to local regulations.

3.6 TONER SUPPLY

1. Clean the image density sensor with a blower brush.
2. Do not touch the sensor pattern with bare hands.
3. Image density sensor adjustment is required in the following cases:

    a) When the ID sensor is replaced
    b) When the main board is replaced
    c) When the drum has been replaced and Vsg is out of specification
    d) When there have been problems with toner supply and the ID sensor check shows Vsg to be out of specification
    e) When the exposure lamp voltage is changed

4. Toner supply unit initial setting (SP No.63) must be done when the machine is installed or the toner supply unit is replaced.

3.7 TRANSFER AND SEPARATION

1. Clean the corona wires and casing with alcohol or water.
2. When adjusting the drum current, always make sure that the axis of the drum shoe is aligned with the corona wire.

3.8 CLEANING UNIT

1. When servicing the cleaning unit, be careful not to damage the edge of the cleaning blade.
2. Do not touch the cleaning brush with bare hands.
3. Before pulling out the cleaning unit, place a sheet of paper under it to catch any toner that spills out.
4. When inserting the cleaning unit into the copier, be sure the cleaning unit rail is properly engaged with the unit guide rail on the copier.
5. Empty the used toner holder every service call.
6. Dispose of used toner according to local regulations.

3.9 FUSING UNIT

1. Be careful not to damage the edges of the hot roller strippers or their tension springs.
2. Do not touch the fusing lamp with bare hands.
3. Make sure that the fusing lamp does not touch the hot roller.

3.10 PAPER FEED

1. Do not touch the pick-up, feed, and reverse rollers with oily hands.
2. Non-standard size copy paper may bind against the cassette side and/or back fences and misfeed. Reposition the fences.

   Example:
   With an A4/LT (sideways) cassette, the proper paper width is 296mm. 297.5mm width paper binds against the cassette fences and does not feed correctly.

3. A worn out registration roller causes paper to crease. It should be replaced.

3.11 DOCUMENT FEEDER

1. Do not bend the DF interface harness at a sharp angle. This damages the fiber optics cables.
2. When installing or reinstalling the document feeder, make sure that the document feeder is in the open position.
3. A buildup of static electricity on the exposure glass can cause originals to jam. Apply silicon oil to the glass to reduce the amount of friction.

3.12 SORTER

1. The sorter has two types of bins, odd numbered and even numbered, which are installed in alternating sequence. Be sure to install them in the correct order.
2. If the bins do not operate smoothly, lubricate the slot liners and transfer wheels using grease 501 or an equivalent type.

3.13 DUPLEX

When lifting the duplex unit out of the duplex tray, hold both sides of the duplex unit frame.

3.14 OTHERS

1. If the toner density in solid image areas decreases, shift the ID sensor bias level to '2' or '3' using SP#33.
2. If the RAM on the old main board is still usable, remove and place it on the new main board. Then, install the new main board to the copier.
3. After installing the new main board with the new RAM, clear the RAM memory using SP mode #99. (Do not clear RAM memory if you have placed the old RAM on the new main board.) Then, check and adjust the data of the following SP modes:

	Customer Requests	Copy Quality/Type of Machine
SP Mode Numbers	15, 16, 17, 19, 20, 21, 22, 23, 25, 27, 28, 29, 76, 77	12, 30-35, 41-44, 47, 48, 54, 56, 70, 71, 74

4. When replacing a sensor, do not overtighten the screws. This may damage the sensor.
5. If a customer reports that red image areas on the original do not appear on the copy, increase the image density. (Press the Manual Image Density key.)

4. SPECIAL TOOLS AND LUBRICANTS

Part Number	Description	Q'ty
A0069105	Drum Shoe Shaft	1
A0489500	Doctor Gap Gauge (1 pc)	1
A0069103	Scanner Wire Clamper (Omega Clamp)	1
A0069104	Scanner Positioning Pin (4 pcs)	1 set
A0089502	Grease G-40M	1
52059101	Gap Gauge - 0.1mm	1
52069600	Sensor Checker	1
52039501	Grease (Shinetsu Silicone G-501)	1
54429106	Drum Shoe	1
54479104	Shoe Adapter	1
54209504	Digital Thermometer	1
54209505	Digital Thermometer Probe	1
54209507	Digital Multimeter	1
54479078	Heat Resistance Grease (MT-78)	1
54209516	Test Chart OS-A3 (10 pcs/set)	
54209502	Test Chart OS-A3 (100 pcs/set)	

5. PREVENTIVE MAINTENANCE SCHEDULE

After performing preventive maintenance, do the following:

1. Set the lamp voltage with SP Mode No. 48. Make a copy of the O-S-A3 test chart at manual image density level 4 to confirm that the lamp voltage is set correctly. (See Exposure Lamp Voltage Adjustment.)
2. Select SP Mode No.56 and set the ADS to 2.5 ± 0.1V by turning VR101.
3. Select SP Mode No.54 and set Vsg to 4.0 ± 0.2V by turning VR102.
4. Make a sample copy.

NOTE: 1) Drum Initial Setting (SP#66) must be done after the drum is replaced.

2) Black Developer Initial Setting (SP#65) must be done after black developer is replaced.

3) Color Developer Initial Setting (SP#10) must be done after color developer is replaced.

5.1 PM TABLE

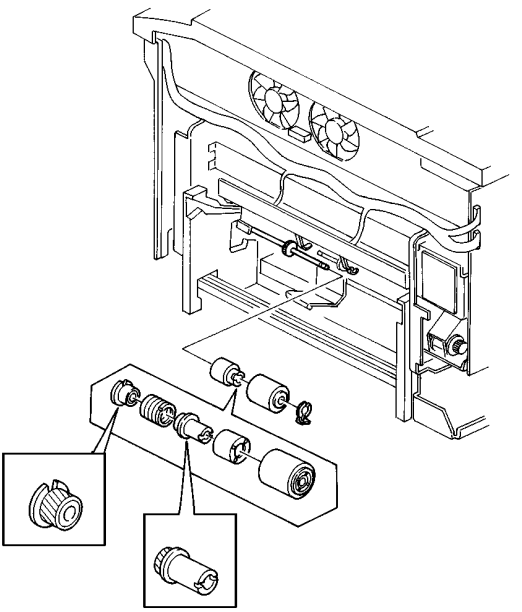
L = Lubricate R = Replace C = Clean I = Inspection

	EM	60K	120K	180K	240K	NOTES
A. OPTICS						
1. Mirrors, lens, reflectors, toner shield glass	C	C	C	C	C	Silicone cloth, cotton pad with water, or blower brush **NOTE**: Clean 6th mirror with blower brush.
2. Exposure glass	C	C	C	C	C	Alcohol or water
3. Platen cover sheet	C	R	R	R	R	Alcohol or water (replace if necessary)
4. Scanner guide rail		C	C	C	C	Dry cloth
5. Magnification guide rail		C	C	C	C	Dry cloth
B. PAPER FEED						
1. Paper feed roller (1st, 2nd, and 3rd)	C		R		R	Water
2. Pick-up roller	C		R		R	Water
3. Registration roller		C	C	C	C	Water (replace if necessary)
4. Relay roller		C	C	C	C	Water
5. Separation roller spring clutch (1st feed station)		L	L	L	L	Mobil temp 78 **Refer To NOTE 1**
6. Separation roller (1st feed station)	C		R		R	Water
7. Paper feed guide plate		C	C	C	C	Alcohol
8. Cassette bottom plate pad		C	R	C	R	Water
9. Paper tray bottom plate pad		C	R	C	R	Water
10. Manual feed bottom plate pad		C	R	C	R	Water
11. Registration Sensor		C	C	C	C	Blower brush
C. AROUND DRUM						
1. Corona wires	C	R	R	R	R	Alcohol or water
2. Wire cleaner		R	R	R	R	
3. Charge grid		C	R	C	R	Blower brush
4. End blocks and casing	C	C	C	C	C	Alcohol or water
5. Transfer guide plate		C	C	C	C	Dry cloth
6. Pre-Transfer lamp	C	C	C	C	C	Dry cloth, discharge any static before installation

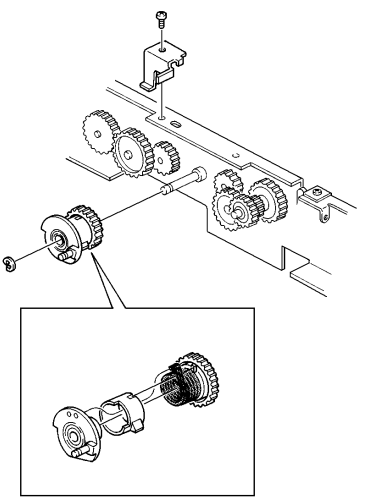
	EM	60K	120K	180K	240K	NOTES
7. Quenching lamp	C	C	C	C	C	Dry cloth, discharge any static before installation
8. ID sensor	C	C	C	C	C	Blower brush
9. Erase lamp unit	C	C	C	C	C	Dry cloth
D. CLEANING UNIT						
1. Cleaning blade			R		R	Replace if necessary
2. Cleaning seal		C	C	C	C	Replace if necessary
3. Cleaning brush			R		R	Replace if necessary
4. Pick-off pawls	C	C	C	C	C	Replace if necessary
5. Used toner bottle	C	C	C	C	C	Empty used toner
E. DEVELOPMENT UNIT						
1. Developer		R	R	R	R	Replace if necessary **Refer to NOTE 4**
2. Upper brush seal		C	C	C	C	
3. Side seals		C	C	C	C	
F. FUSING UNIT						
1. Hot roller		C	C	R	C	If necessary
2. Pressure roller		C	C	R	C	If necessary
3. Stripper pawls		C	C	C	C	Suitable solvent, replace if necessary
4. Fusing entrance and exit guides		C	C	C	C	Suitable solvent
5. Fusing thermistor		I	I	I	I	Suitable solvent, clean if necessary
G. OTHERS						
1. Ozone filter		R	R	R	R	
2. Drive belt		I	I	I	I	Replace if necessary
3. Bushings			L		L	Spindle oil
4. Exit Sensor		C	C	C	C	Blower brush
H. DOCUMENT FEEDER						
1. Transport Belt	C	C	R	C	R	Belt Cleaner
2. Separation Belt	C	R	R	R	R	Do not touch friction face
3. Pick-up Roller		C	C	C	C	Alcohol, replace if necessary
4. Separation Roller		C	C	C	C	Alcohol
5. Feed-in Clutch	L					Mobil Temp. 78

	EM	60K	120K	180K	240K	NOTES
J. SORTER						
1. Bin guide/wheel		L	L	L	L	Grease G501(if necessary)
2. Round Belt		C	C	C	C	Alcohol
3. Guide plate		C	C	C	C	Dry cloth
K. DUPLEX						
1. Feed roller	C		R		R	Replace if necessary
2. Friction roller	C		R		R	Replace if necessary
3. Bottom plate pad			R		R	Replace if necessary
4. Round belt		I	R		R	Replace if necessary
5. Spring clutch			L		L	Mobil temp 78, lubricate if necessary **Refer to NOTE 2**

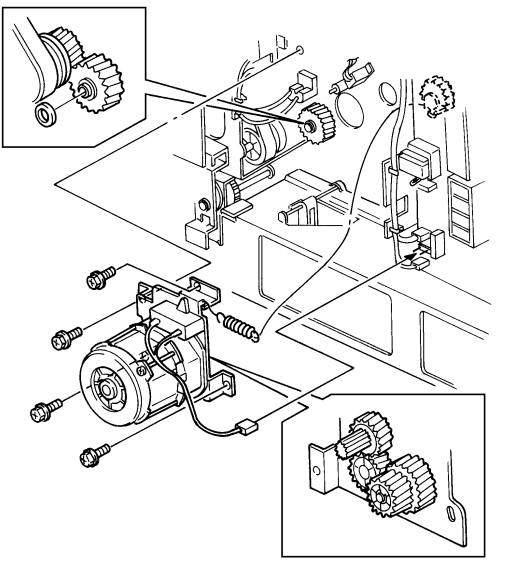
NOTE 1: Clean and lubricate the spring clutch of the reverse roller at every PM.



NOTE 2: Clean and lubricate the paper lift spring clutch of the duplex tray every 120K copies.



NOTE 3: When replacing the main motor, lubricate the gear using Grease G501.



NOTE 4: Replace the black and color developer at PM, refering to the following supply yield table, if necessary. The yield is different for the black and color developer due to the carrier characteristics.

DEVELOPER COLOR	TARGETED SUPPLY YIELD
Black	60K copies
Red	30K copies
Blue	30K copies
Green	30K copies

5.2 EXPLANATION OF REGULAR PM

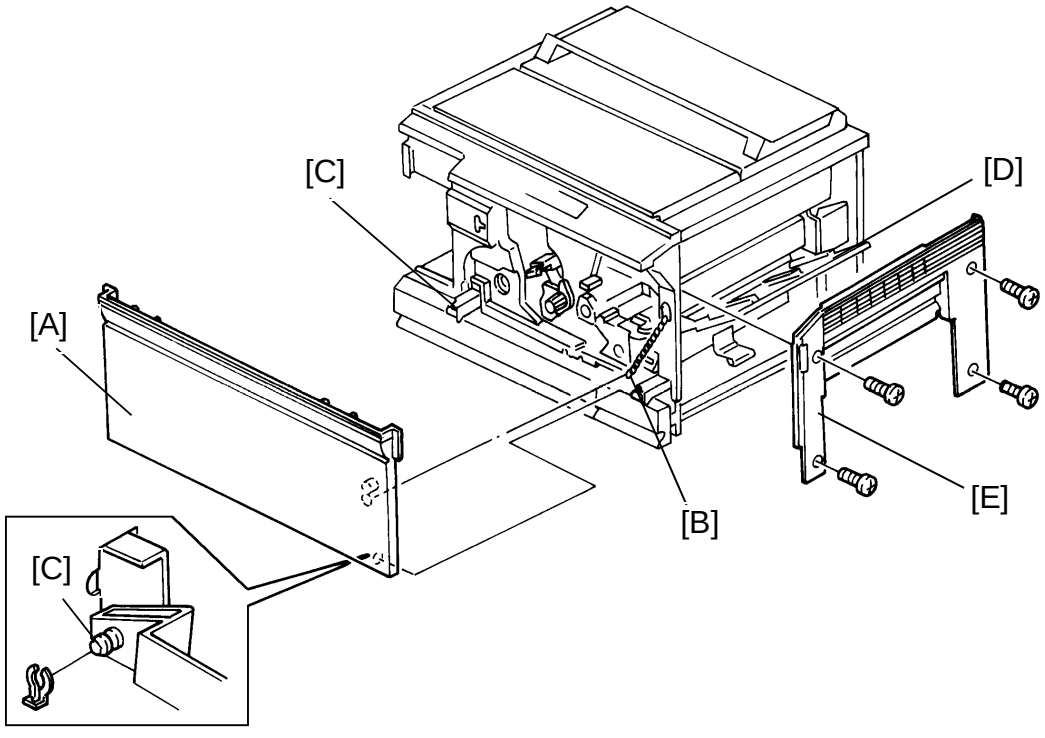
Item		Explanation
Optics Unit	Mirrors, Lens, Reflector, Exposure Glass, Platen Cover	Stains on any part of the optics unit result in a dirty background, black lines, or areas of decreased sharpness on the copy image. Periodic cleaning is required. The exposure glass and the platen cover must also be cleaned. If stains on the platen cover cannot be removed, it must be replaced.
	Exposure Lamp	Deterioration of the exposure lamp affects the copy image. Check the lamp at regular intervals and replace if discolored.
	Optical Fiber	A dirty optical fiber receptor can result in insufficient image density. Clean at regular intervals.
Paper Feed, Registration	Paper Feed Roller, Pick-up Roller, Separation Roller	This machine uses cassettes for paper feeding. If paper powder or dust adheres to the paper feed roller and rollers are worn out, paper may not feed correctly and/or skewing may result. Cleaning or replacement is required at regular intervals.
	Registration Roller	A dirty registration roller can cause paper to register incorrectly, skew, or jam. Cleaning is required at regular intervals.
Transport	Transfer Guide Plate	If the transfer guide plate is dirty, the back sides of the copy may become dirty. Clean the plate at regular intervals.
Around Drum	Charge Wires	Dirty charge wires may cause uneven image density. They should be cleaned or replaced at regular intervals.
	End Blocks	Toner tends to accumulate on the corona end blocks, and this can result in poor copy quality or even a high voltage leak. Clean end blocks at regular intervals.
	QL	If toner accumulates on the QL, a dirty background or a repeating negative image may result. Clean the QL at regular intervals.
	PTL	If paper dust or toner accumulates on the PTL, its efficiency may be reduced. This can cause toner to be reattracted to the drum during transfer, reducing image density. Clean the PTL at regular intervals.
	ID Sensor	If paper dust or toner accumulates on the ID sensor, the toner density cannot be controlled correctly. This results in light copy or overtoning. Clean this sensor at regular intervals.
	Erase Lamp	If toner accumulates on the erase lamp, a dirty background may occur that becomes progressively worse in long copy runs. Clean this lamp at regular intervals.

Item		Explanation
Cleaning Unit	Cleaning Blade	A dirty or worn out cleaning blade will cause black lines on copies and/or scratches on the drum. The blade must be replaced or cleaned at regular intervals.
	Cleaning Brush	A worn out cleaning brush will not clean effectively, resulting in a dirty background and damage to the cleaning blade. Replace at regular intervals.
Fusing Unit	Thermistor	If toner accumulates on the thermistor, fusing temperature control may not be accurate. Inspect the thermistor at regular intervals.
	Stripper Pawls	Toner or dust adhering to the stripper pawls can cause a paper jam. Clean or replace the pawls at regular intervals.
	Fusing Entrance and Exit Guides	Toner piling up on the guide plate will cause a dirty background on the copy. Clean the guide plate at regular intervals.
Duplex Unit	Paper Feed and Friction Rollers	The duplex unit uses the feed and friction roller (FFR) system. If paper dust or dust adheres to the paper feed and friction rollers and if the rollers are worn out, paper may not feed correctly and/or skewing may result. Cleaning or replacement is required at regular intervals.
	Transport Roller	A transport roller that is dirty or slips may cause a dirty copy image or a paper jam. Clean the rollers at regular intervals.
	Round Belt	The round belt transmits driving power to the turn guide roller. When the belt wears out (breaks or stretches), a paper jam may occur. Replace the belt at regular intervals.
ARDF	Transport Belt	A dirty transport belt can leave stains on copies. Clean or replace the belt at regular intervals.
	Pick-up Roller, Separation Roller, Separation Belt	When dirty, these rollers and this belt can leave stains on the copy paper. Clean or replace these parts at regular intervals.
Sorter	Bin Drive Wheel, Bin Guide	Dust adhering to the bin drive wheel or bin guide may interfere with bin movement and result in uneven bin positioning. Clean and lubricate if necessary.

SECTION 5
REPLACEMENT AND ADJUSTMENT

1. EXTERIOR AND INNER COVERS

1.1 EXTERIOR COVER REMOVAL

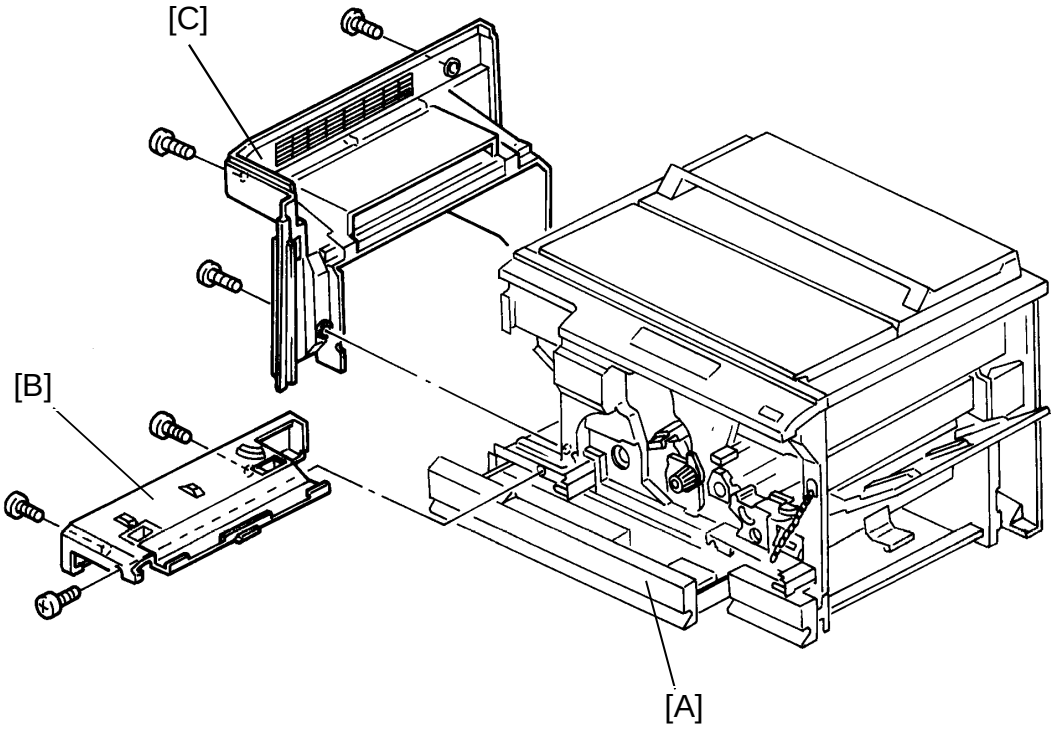


1.1.1 Front Cover

1. Open the front cover [A].
2. Unhook the chain [B] from the front cover.
3. Slide the front cover off the holding pins [C] (1 snap ring) and remove it.

1.1.2 Right Cover

1. Open the front cover and the manual feed table [D].
2. Remove the right cover [E] (4 screws).



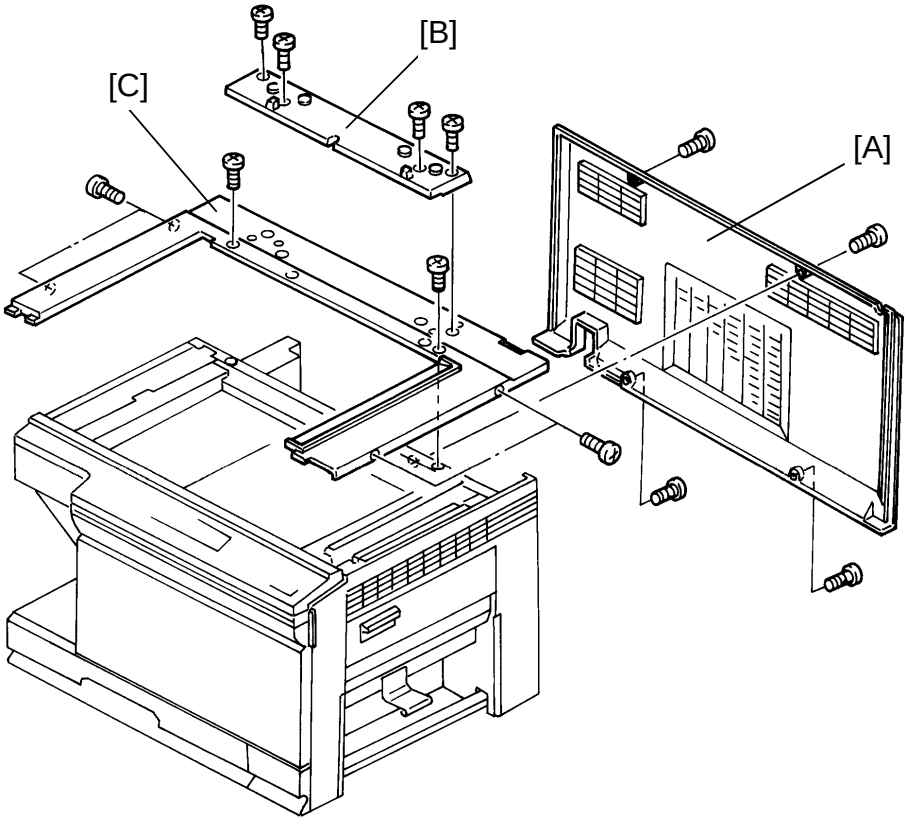
1.1.3 Left Lower Cover

1. Pull out the paper tray or the duplex tray [A].
2. Remove the left lower cover [B] (3 screws).

1.1.4 Left Upper Cover.

1. Remove the left lower cover.
2. Open the exit unit.
3. Remove the left upper cover [C] (4 screws).

NOTE: Remove the sorter if it is installed.



1.1.5 Rear Cover

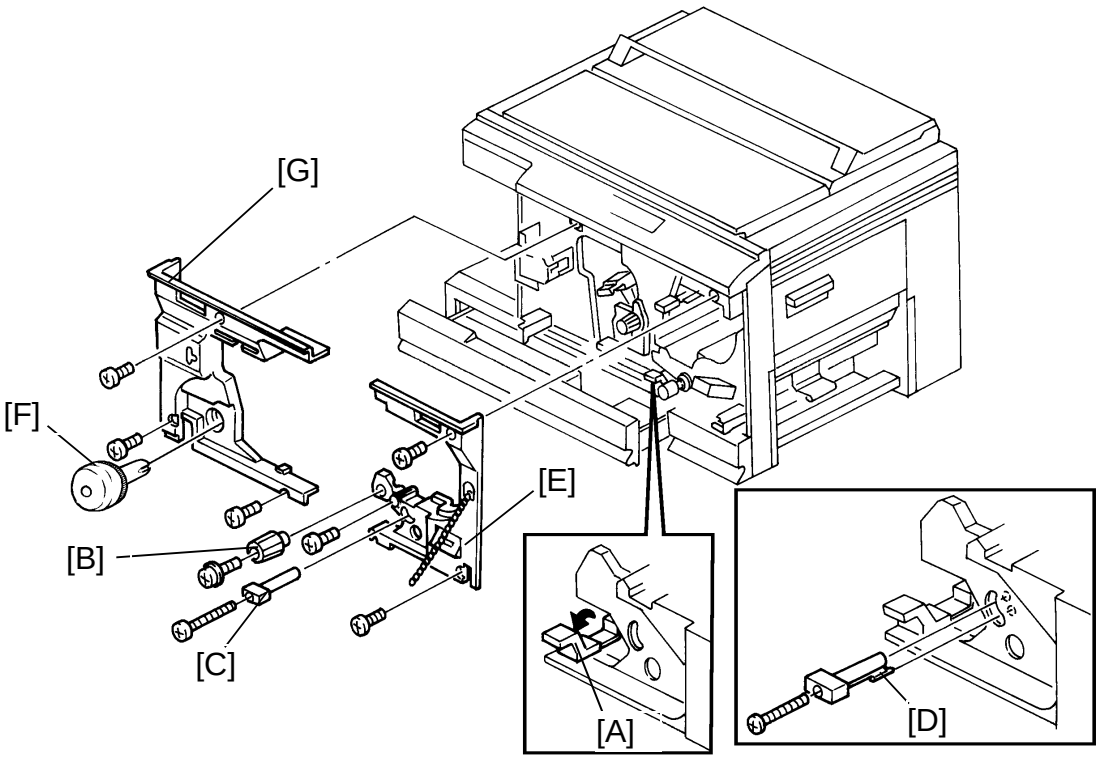
Remove the rear cover [A] (4 screws).

1.1.6 Upper Cover

1. Remove the platen cover.
2. Remove the platen cover pedestal [B] (4 screws).
3. Remove the upper cover [C] (6 screws).

NOTE: Remove the DF if it is installed.

1.2 INNER COVER REMOVAL



1.2.1 Right Inner Cover

1. Open and remove the front cover.
2. Remove the development unit.
3. Lower the turn guide lever [A].
4. Remove the registration knob [B] and paper guide release lever [C] (1 screw each).

NOTE: When reinstalling the release lever [C], make sure that the pin [D] on the lever is properly set in the paper guide.

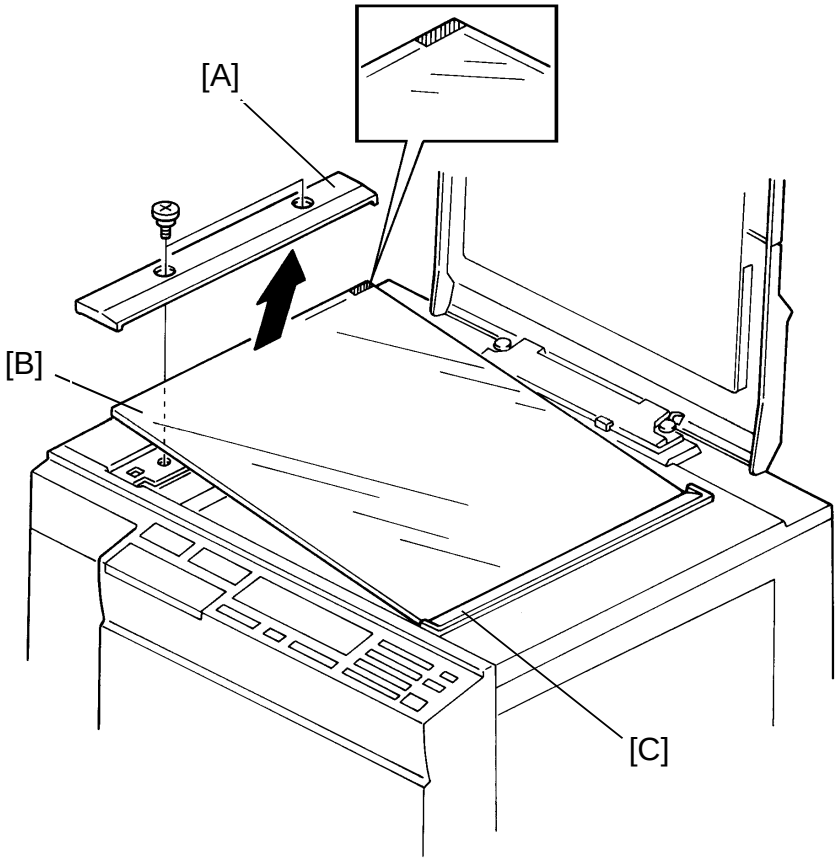
5. Remove the right inner cover [E] (3 screws).

1.2.2 Left Inner Cover

1. Open and remove the front cover.
2. Remove the fusing roller knob [F].
3. Remove the left inner cover [G] (3 screws).

2. OPTICS

2.1 EXPOSURE GLASS REMOVAL



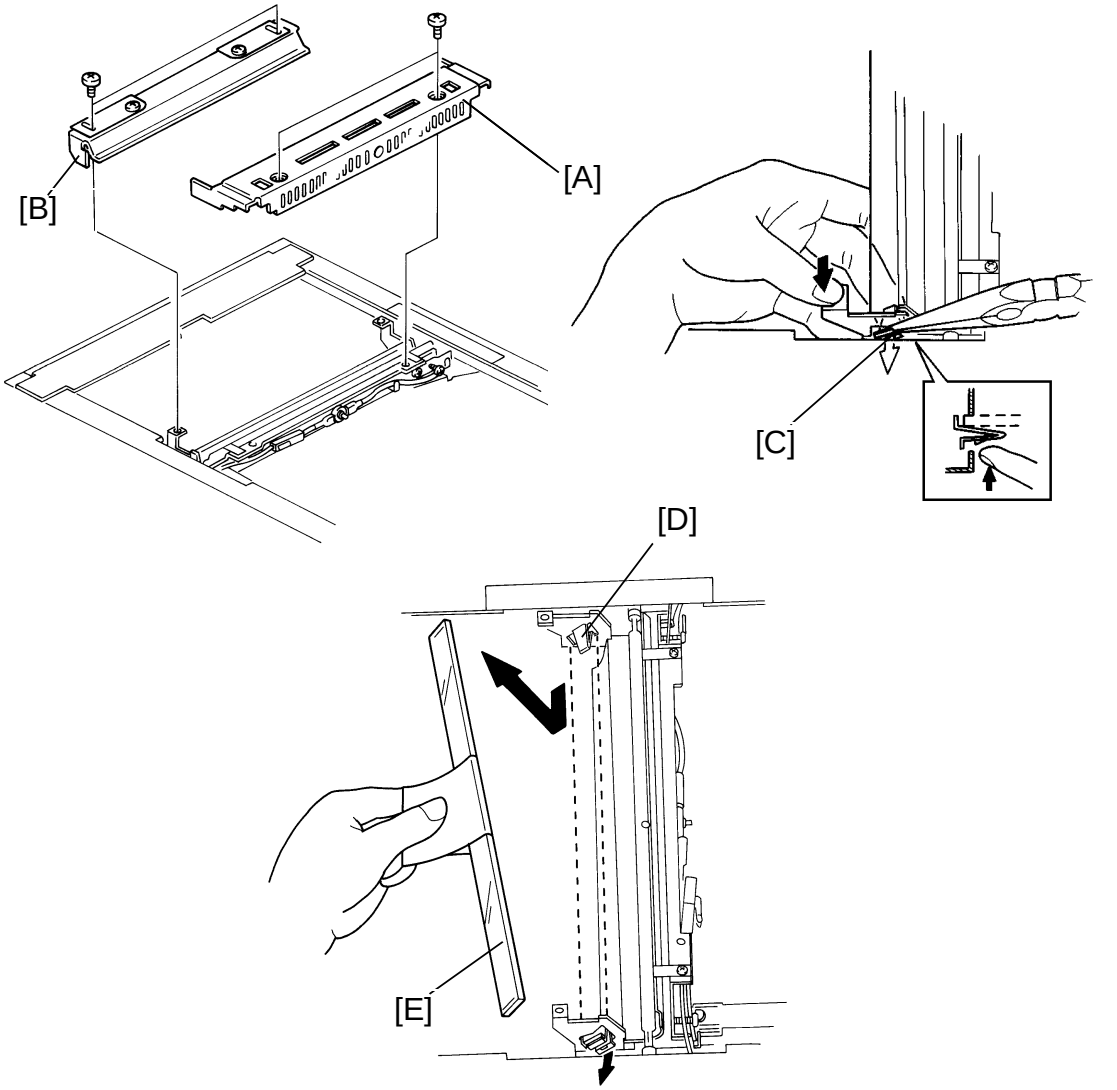
1. Take off the left scale [A] (2 short screws).
2. Grasp the left edge of the exposure glass [B] and lift up slightly. Slide the other edge out from under the right glass holder [C]. Remove the exposure glass.

NOTE: When reinstalling the exposure glass, make sure of the following:

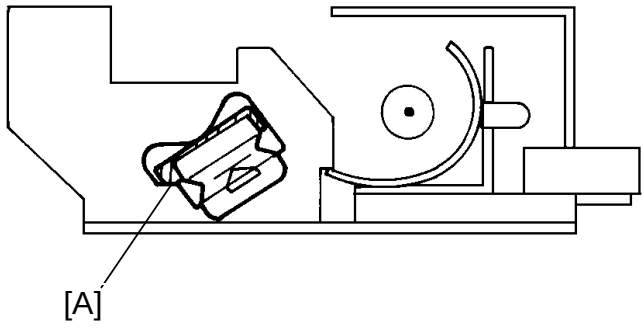
a) The left edge of the glass is flush with the tab to the left of the scale plate, and the right glass holder firmly secures the exposure glass.

b) The red mark on the edge of the glass faces up. This side is smoother and it generates less static electricity when the DF is used.

2.2 1ST MIRROR REMOVAL



1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the first scanner to the cutout position (150 mm from the left scale).
4. Remove the reflector cover [A] (2 screws).
5. Remove the sub-reflector cover [B] (2 screws).
6. With your thumb, press down on the 1st scanner as shown to hold it in place. Then, while holding down the scanner, press up on the front spring plate [C] with another finger and remove the plate with a pair of pliers. Leave the rear spring plate [D] in position in the rear side plate cutout.
7. Carefully slide the 1st mirror [E] towards the front of the machine and lift the mirror out of the machine rear side first.



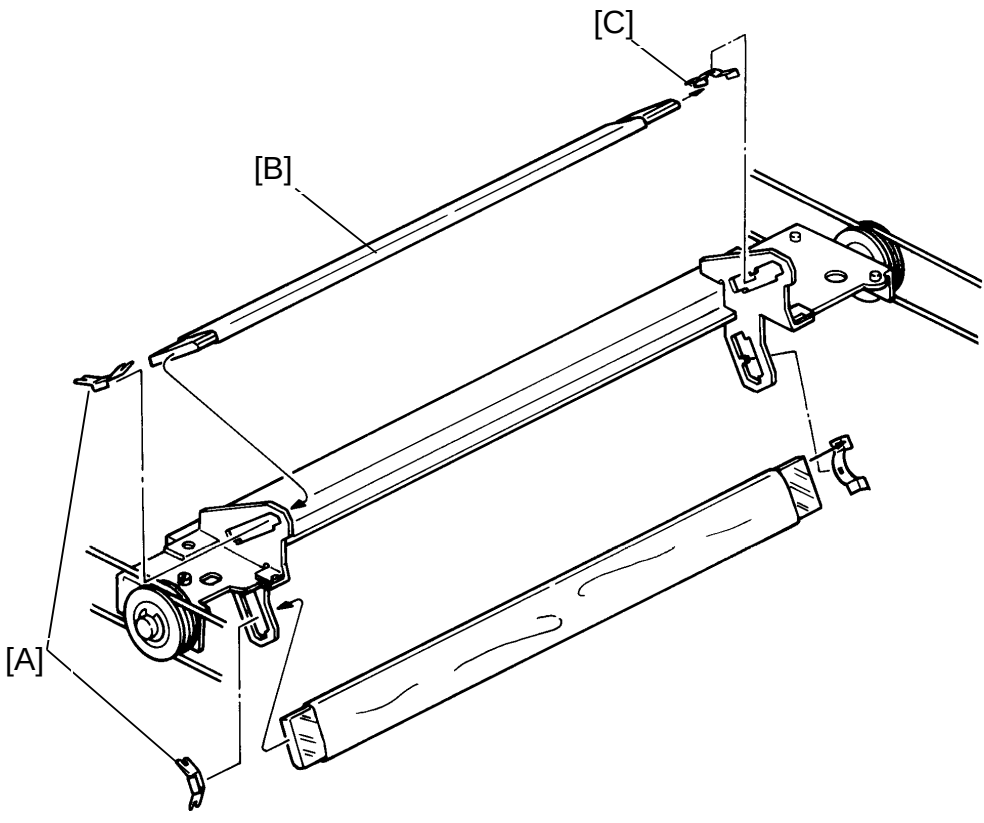
- To install -

1. Insert the 1st mirror into the front side plate cutout. Then insert the rear side of the mirror into the rear spring plate.

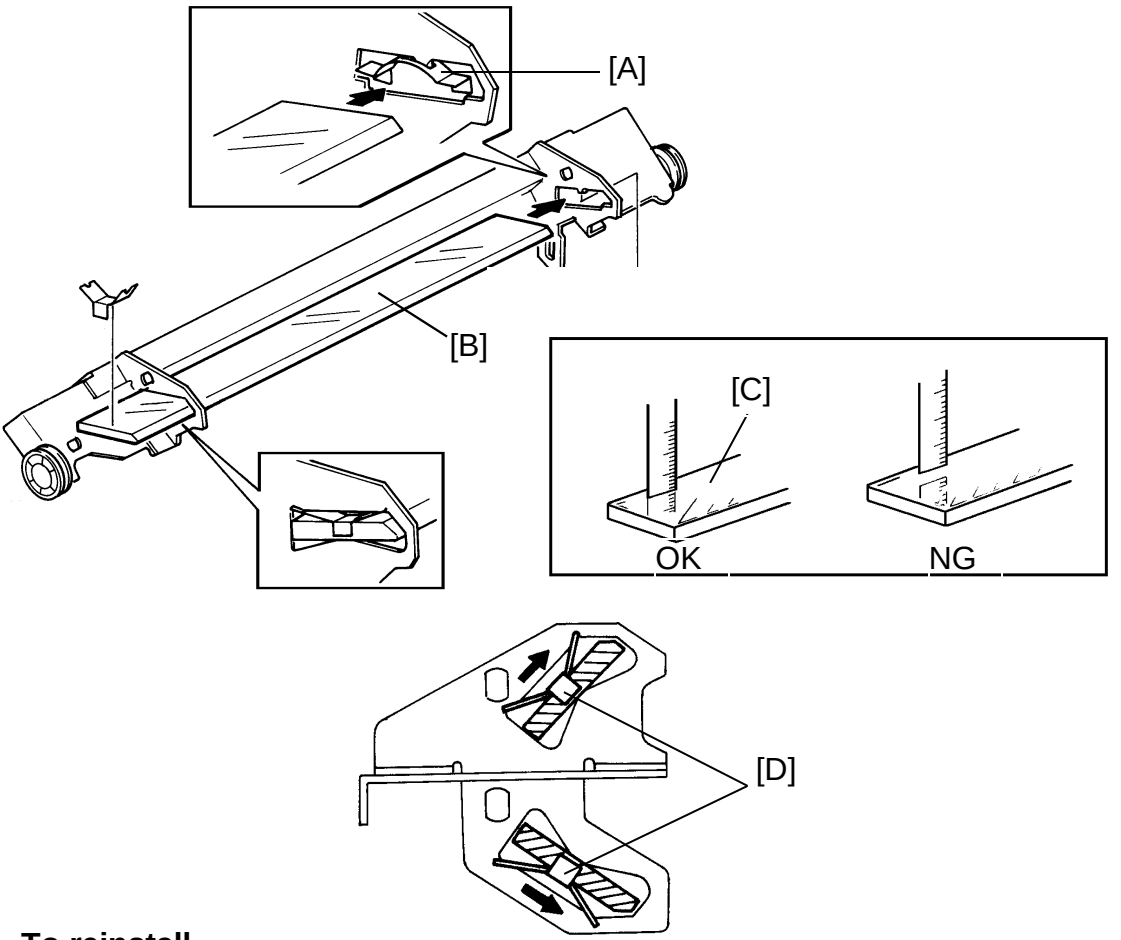
   NOTE: Make sure when installing the mirror that the reflecting surface is on the upper side and the beveled edge [A] of the mirror is on the lower side.

2. Insert the front spring plate between the mirror and the front side plate cut-out.

2.3 2ND AND 3RD MIRROR REMOVAL



1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Slide the 1st scanner 2/3 of the way to the right.
4. Press down on one side of the front spring plate [A] and pull it off the end of the mirror.
5. Carefully shift the 2nd mirror [B] towards the front of the machine to remove the rear spring plate [C].
6. Lift the mirror out of the machine rear side first.



- To reinstall -

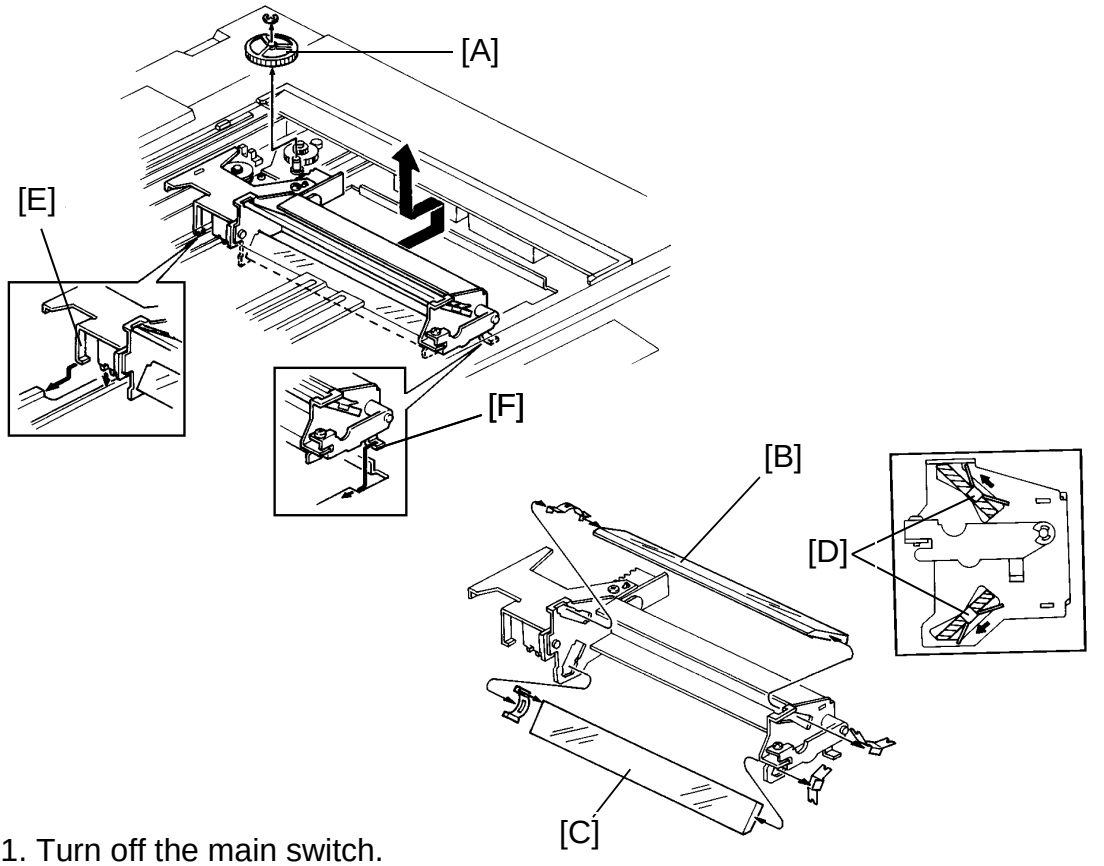
1. Hold the rear spring plate [A] in position as shown.
2. Insert the 2nd mirror [B] into the front side plate cutout.
3. Position the rear end of the mirror under the rear spring plate in the rear side plate cutout.
4. Fit the front spring plate over the front end of the mirror. Make sure that the slot on each arm of the spring plate fits over the edge of the cutout as shown.

NOTE: a) Make sure when installing the mirrors that the reflecting surfaces [C] face the lens.

b) The front and rear spring plates are different. Make sure that each plate is placed in the correct position.

c) Position the spring plate [D] by moving it in the direction of the arrow.

2.4 4TH AND 5TH MIRROR REPLACEMENT



1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the lens cover (2 screws).
4. Remove the 4th and 5th mirror assembly drive gear [A] (1 E-ring).
5. Slide the mirror assembly all the way to the right and remove it.
6. Replace the fourth [B] and fifth [C] mirrors. (The procedure for removing the mirrors from their brackets is the same as with the second and third mirrors.)

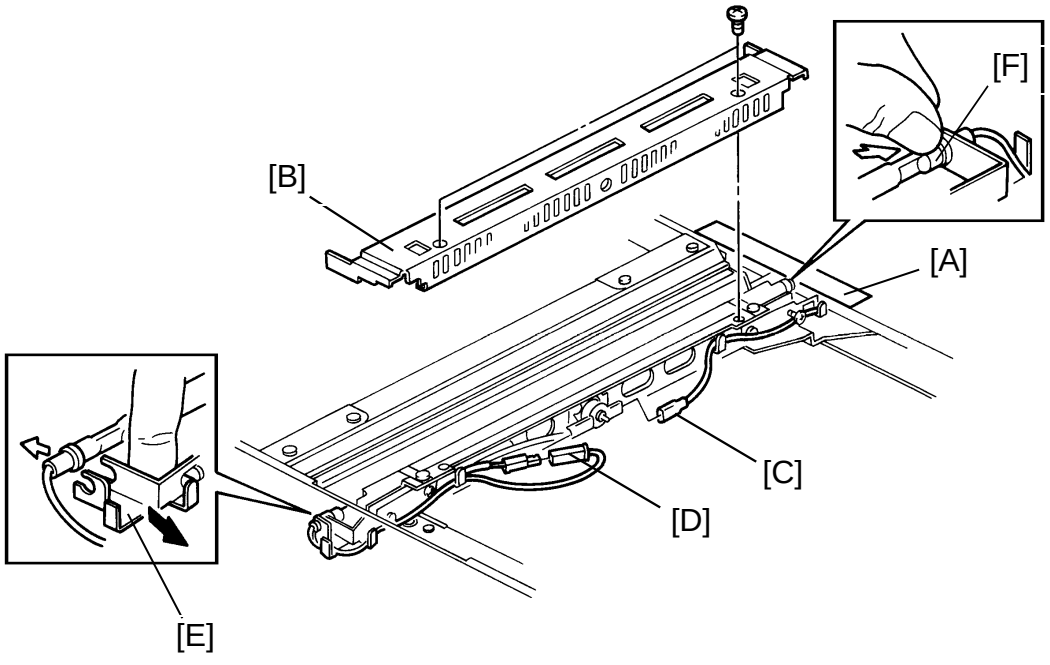
NOTE: a) Make sure that the mirrors are installed in their original positions. (The fourth mirror is larger than the fifth mirror.)

b) The front and rear spring plates are different. Be sure to mount them in the correct positions.

c) Position the spring plates [D] as shown. Move them in the direction of the arrow.

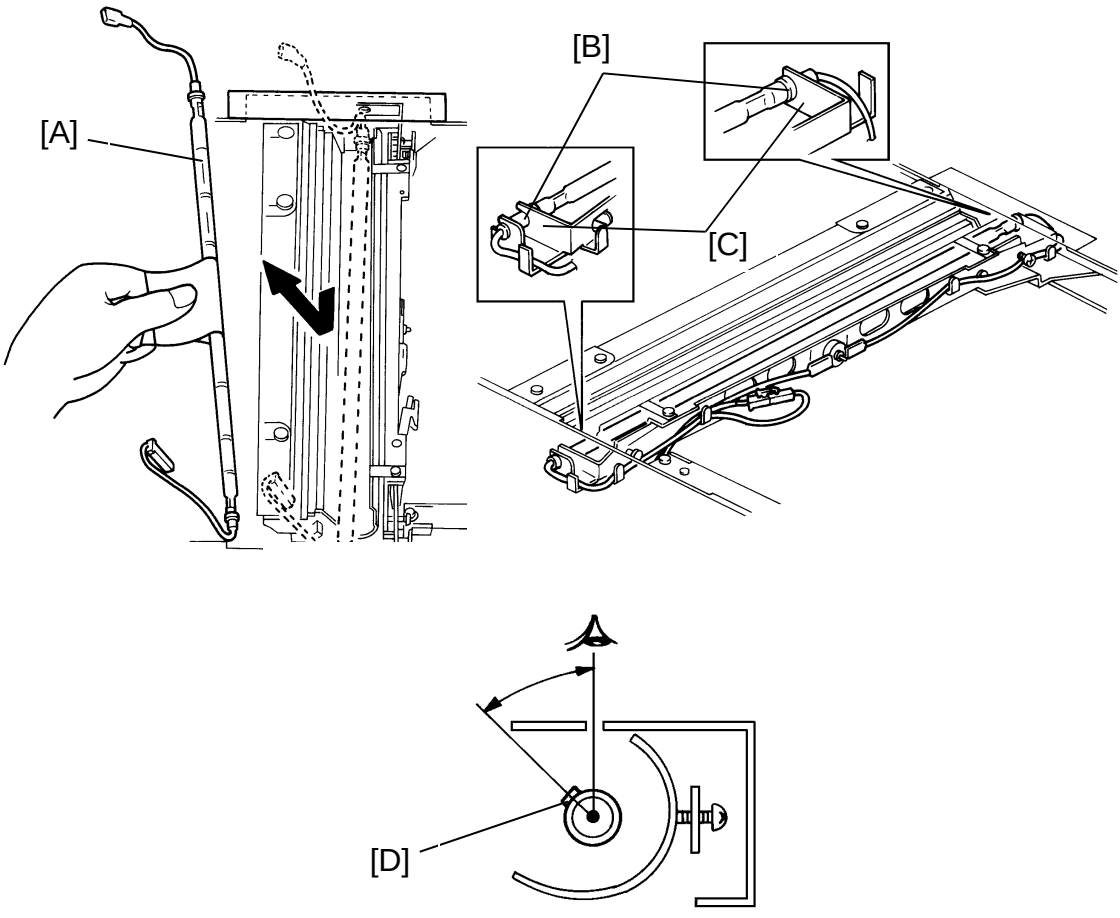
d) When reinstalling the 4th and 5th mirror assembly, make sure that the hooks [E and F] are properly positioned as shown.

2.5 EXPOSURE LAMP REPLACEMENT



NOTE: Do not touch the reflector or the new exposure lamp with your bare hands. Use a strip of paper as shown. (Oil marks from fingers on the lamp or reflectors will be affected by heat from the lamp and will cause discoloration.)

1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the first scanner to the cutout position at the rear frame [A]. (See illustration.)
4. Remove the reflector cover [B] (2 screws).
5. Disconnect the exposure lamp wires [C] [D] (1 terminal and 1 connector).
6. Press the release lever [E] on the front terminal while pressing the insulator [F] of the lamp as shown.



7. Remove the exposure lamp [A] from the rear spring plate by moving the lamp toward the front.

8. Install a new lamp. Use a strip of paper as shown to hold the lamp. Set the rear terminal first.

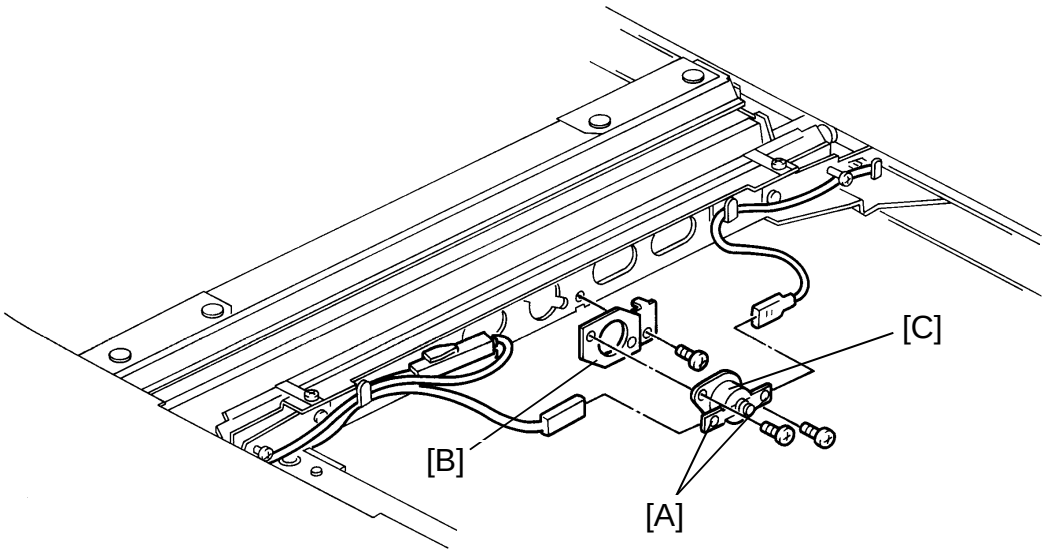
NOTE: a) Make sure that the lamp is set so that the terminal side of the exposure lamp routes through the rear side of the copier.

b) Make sure that the insulators [B] are properly supported with the terminals [C].

c) Make sure that the blister [D] on the lamp points towards the reflector opening (left side of the copier) as shown.

d) Check the exposure lamp position, light intensity and ADS sensor adjustment. (See Exposure Lamp Position Adjustment, Light Intensity Adjustment and ADS sensor Adjustment.)

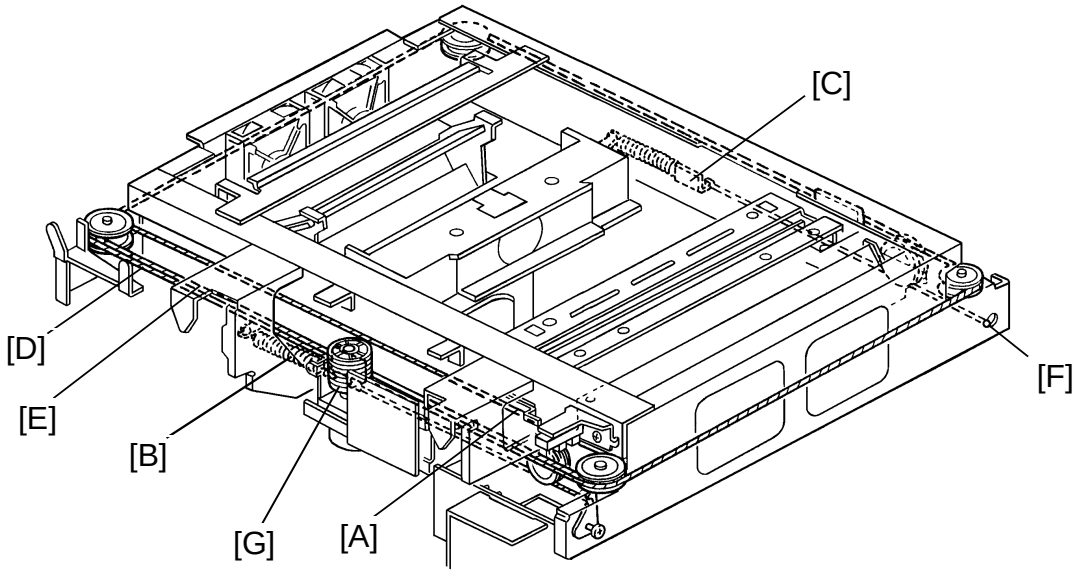
2.6 THERMOSWITCH REPLACEMENT



1. Turn off the main switch.
2. Remove the exposure glass (2 screws).
3. Slide the first scanner 150 mm to the right.
4. Remove the reflection plate cover (2 screws).
5. Remove the exposure lamp leads from the terminals [A] on both sides of the thermoswitch.
6. Remove the thermoswitch bracket [B] (1 screw).
7. Remove the thermoswitch [C] from the bracket (2 screws), and replace it.

2.7 SCANNER DRIVE WIRE REPLACEMENT

2.7.1 Wire Removal

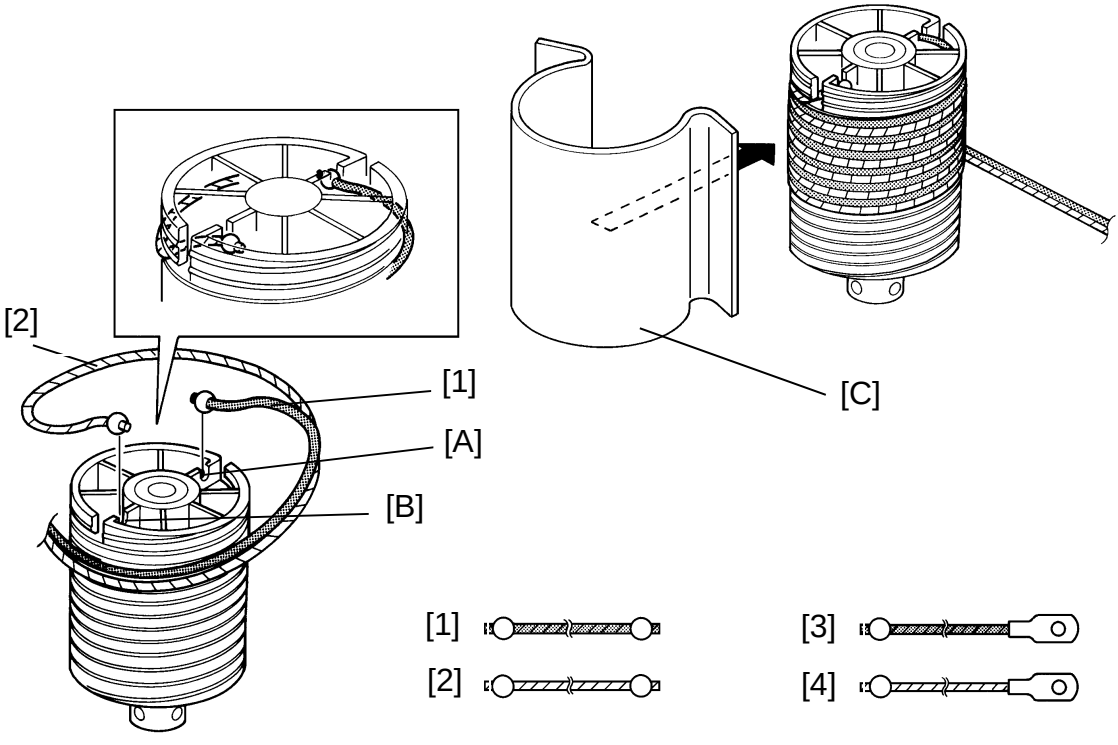


1. Remove the following covers and parts.

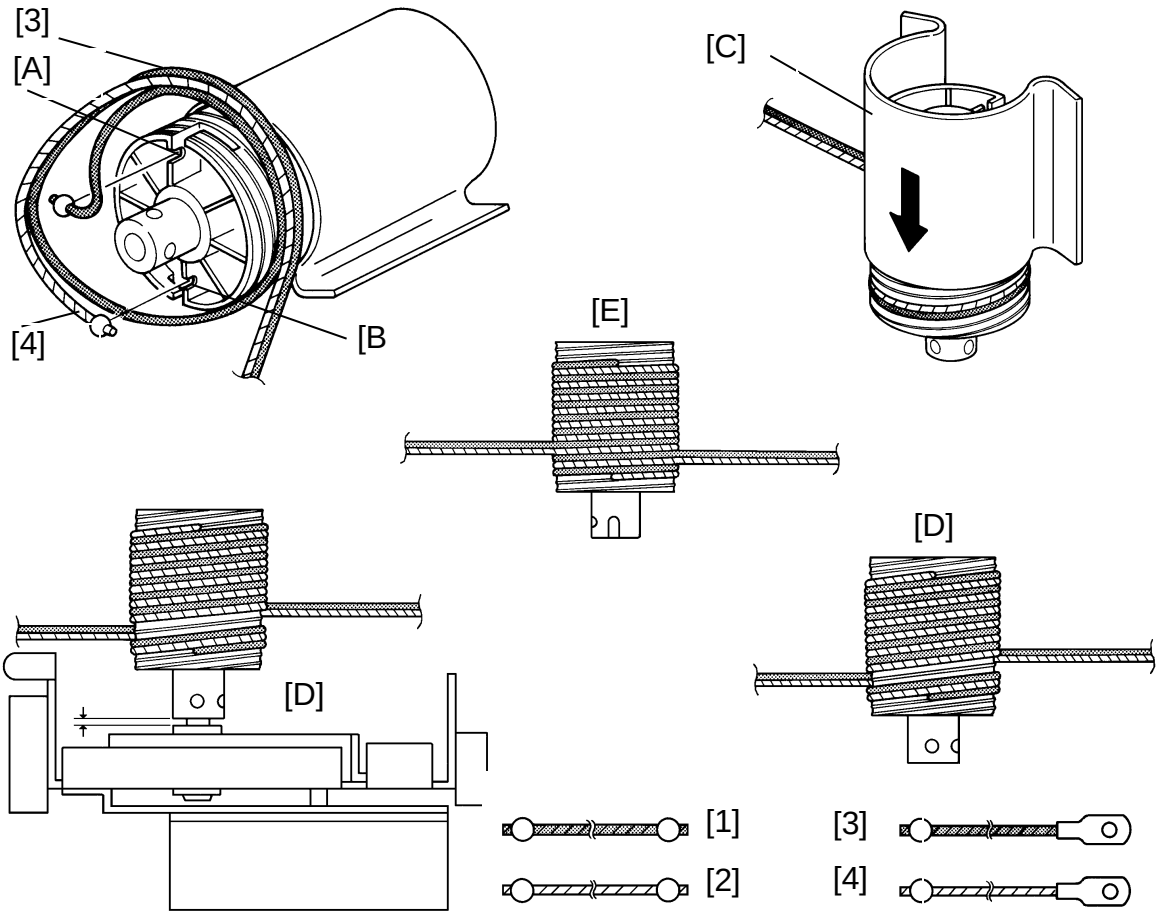
Sorter (if installed)	Document feeder (if installed)
Front cover	Development unit
Left and right inner covers	Left lower cover
Left upper cover	Rear cover
Right cover	Upper cover
Operation panel	Exposure glass
TC/SC power pack	

2. Loosen the screws securing the front and rear first scanner wire clamps [A].
3. Remove the front and rear wire tightened springs [B].
4. Loosen the screws securing the front and rear wire fixing plates [C].
5. Remove scanner wires [D] and [E] from the drive pulley.
6. Remove scanner wire [F] from the left side plate.
7. Remove scanner wire from the drive pulley [G].
8. Remove the drive pulley.

2.7.2 Wire Installation



1. Position the scanner drive pulley as shown with the Allen screws facing you.
2. Put the bead at the end of the blue wire [1] in slot [A] (opposite from the Allen screws).
3. Put the bead of the silver wire [2] in slot [B] on the Allen screw side.
4. Wind the blue wire [1] clockwise halfway around the pulley. Wind the silver wire [2] clockwise one complete turn around the pulley.
5. Wind the blue and silver wires together five and a half times around the pulley. Make sure that the blue wire is wound six times and the silver wire is wound six and a half times in total.
6. Set the omega clamp [C] over the wires on the drive pulley as shown.



7. Put the bead of the blue wire [3] in slot [A] on the Allen screw side.

8. Put the bead of the silver wire [4] in slot [B].

9. Wind the blue wire [3] clockwise one and a half times around the pulley. Wind the silver wire [4] once clockwise around the pulley.

10. Slide the omega clamp [C] down to secure all the wires as shown.

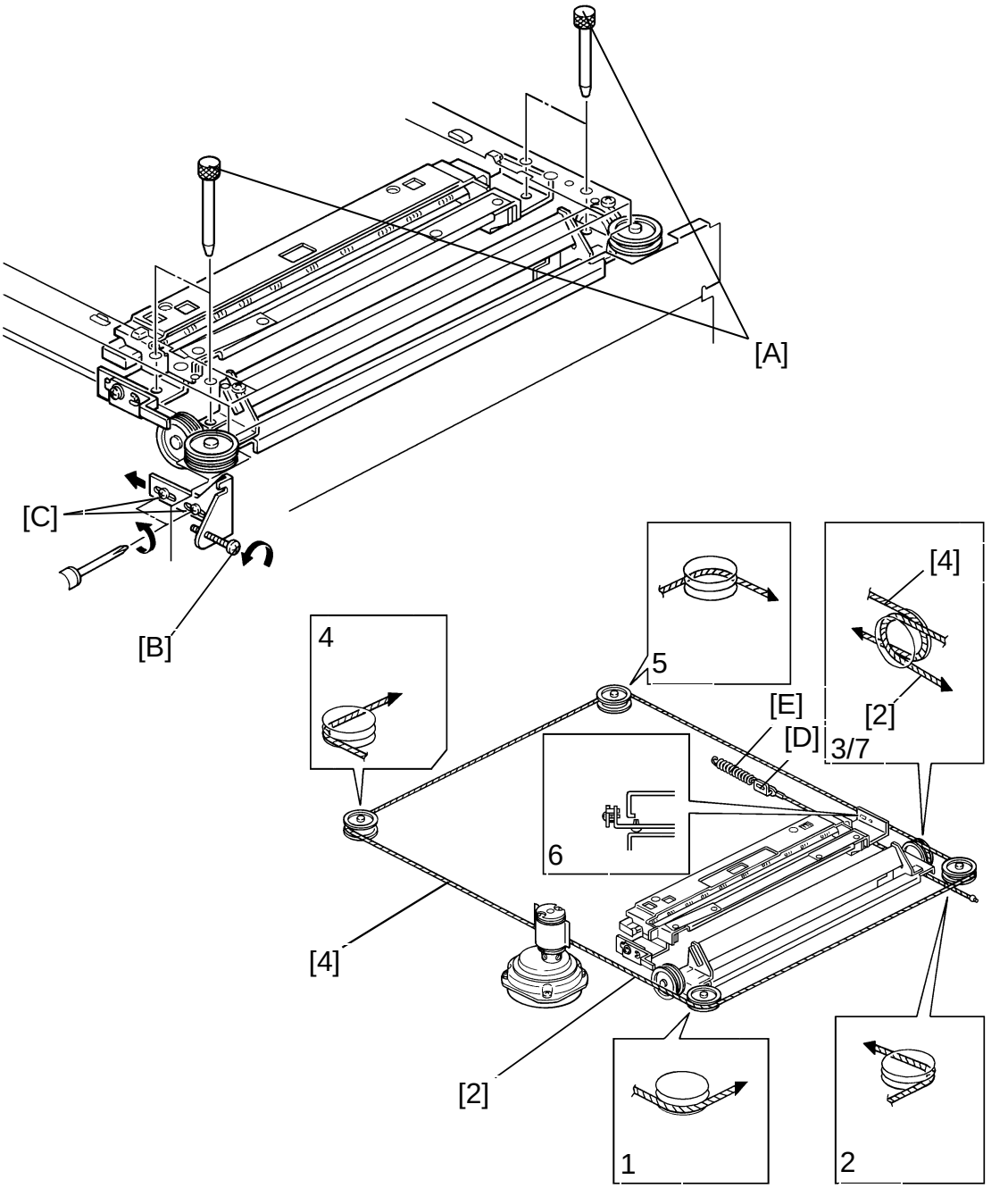
NOTE: a) The blue and silver wires alternate on the pulley with the blue wire uppermost.

b) Wires are not wound around the two grooves shown in the illustration (rear view [D]).

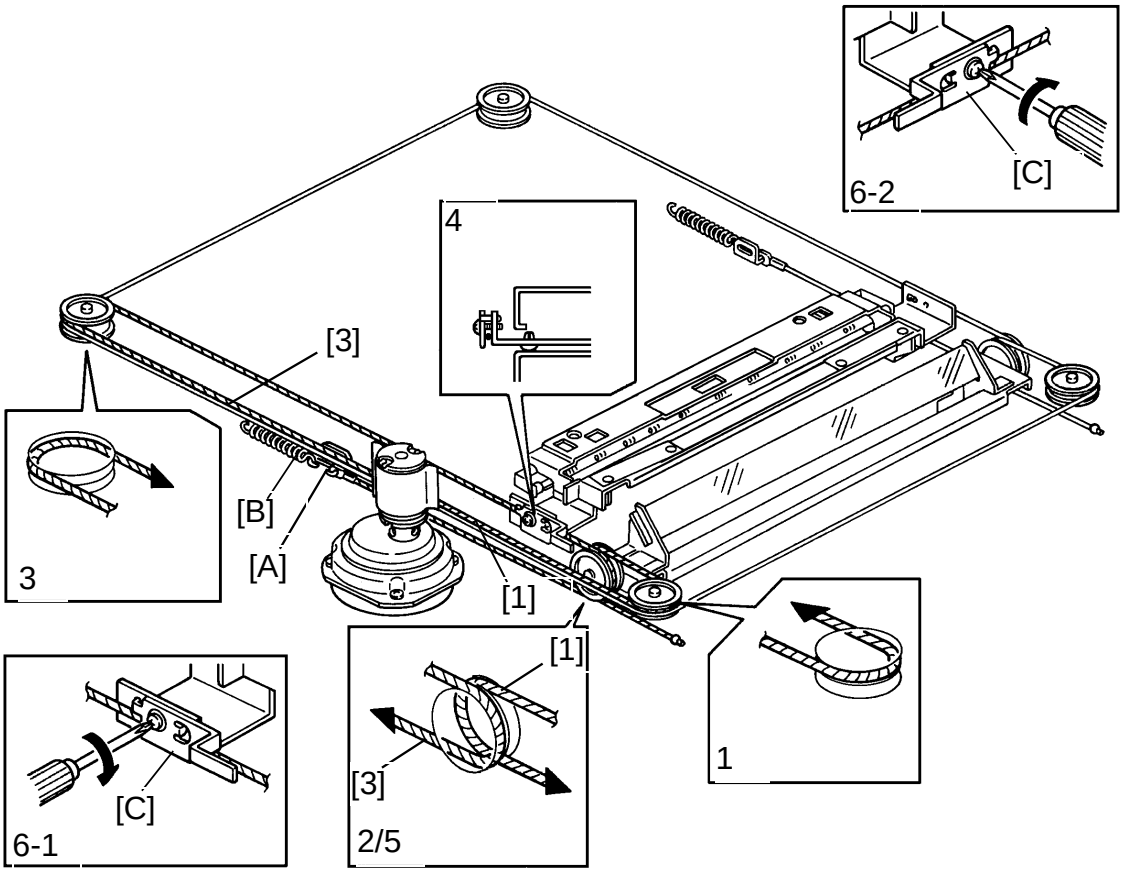
c) Wires are wound around all the grooves shown in the illustration (front view [E]).

11. Set the pulley on the drive shaft and tighten both Allen screws.

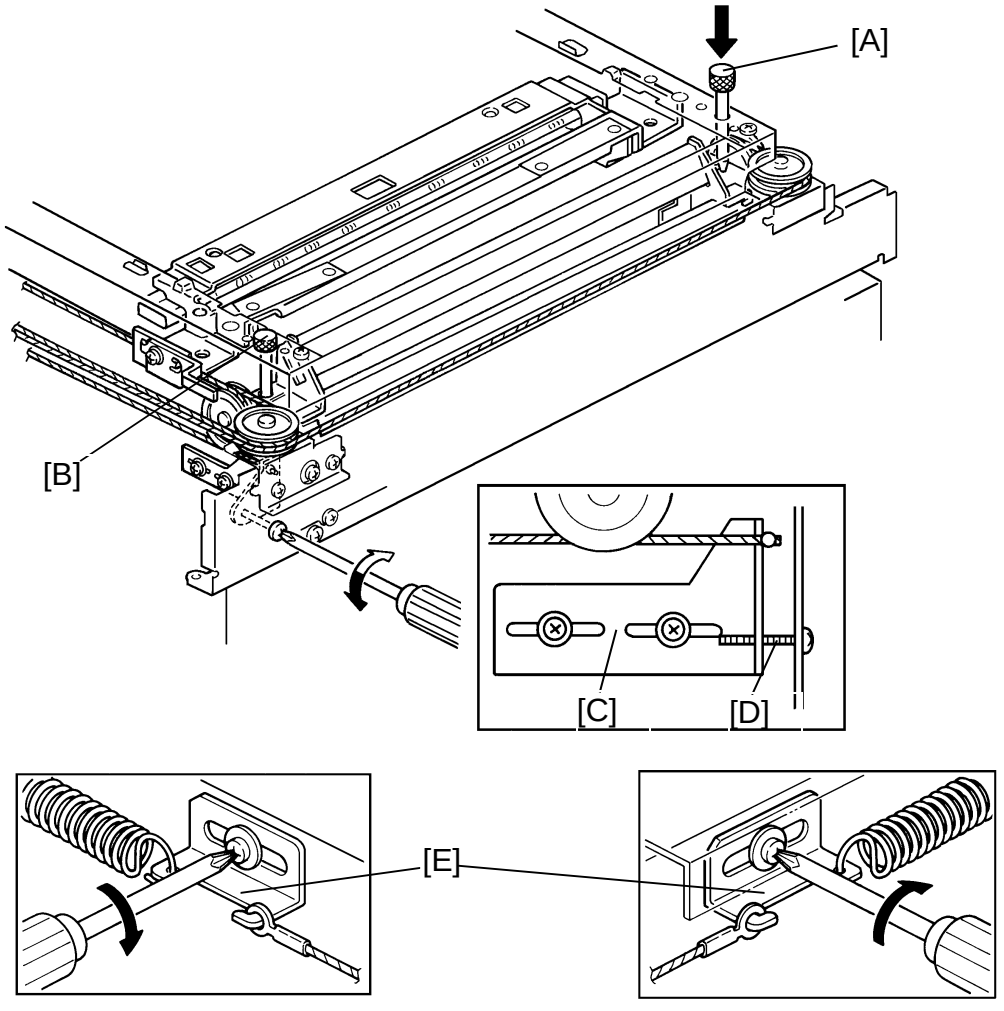
NOTE: Maintain 1 mm of clearance between the pulley and the bushing as shown above. Place the scale (1 mm thick) between the pulley and the bushing before tightening the Allen screws on the pulley.



12. Manually move the first and second scanners to home position.
13. Insert the four positioning pins [A] in the holes on the scanner guide rails to secure the first and second scanners.
14. Loosen the wire tension bracket fixing screw [B] and the wire tension adjusting screws [C].
15. Loosen the screw securing the front fixing plate [D]. Place wires [2] and [4] on the pulleys as shown.
16. Hook the silver wire [4] onto the fixing plate and hook the wire tension spring [E] onto the fixing plate and the frame projection.

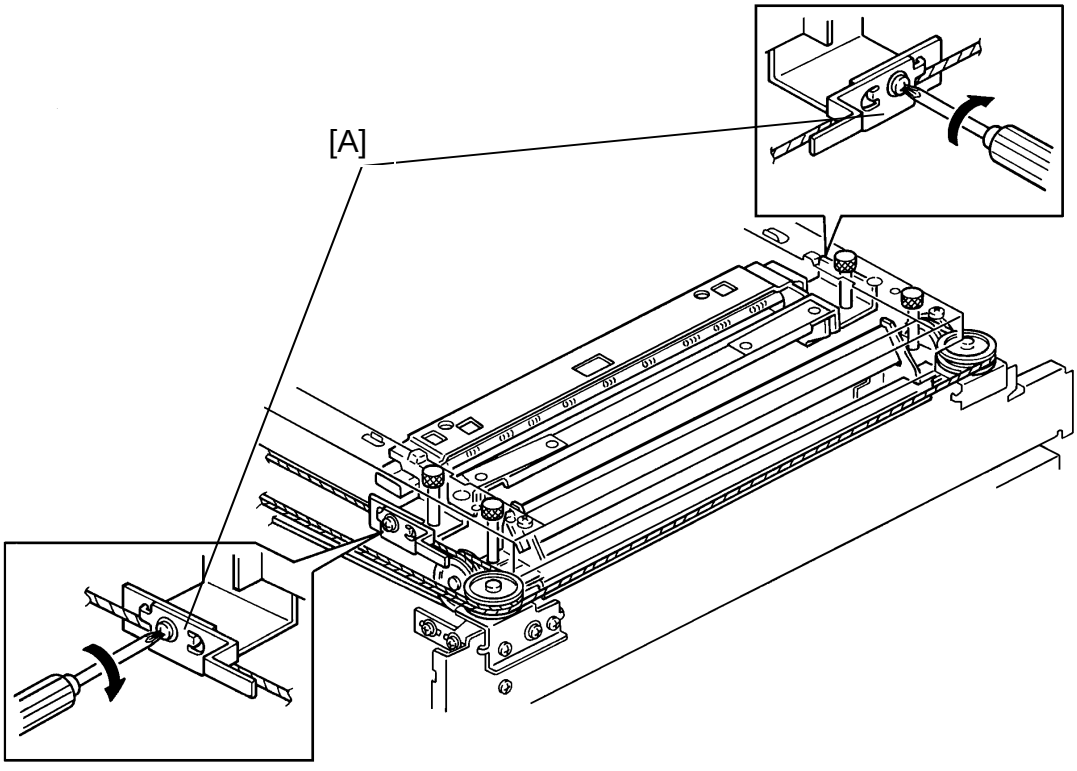


17. Attach blue wires [1 and 3] around the pulleys as shown.
18. Attach wire [3] to the wire fixing plate [A], then hook one end of tension spring [B] to the fixing plate and the other end to the frame projection.
19. Tighten the first scanner clamps [C] and remove the four positioning pins and the omega clamp.
20. Perform free run (turn DIP switch 101-1 ON) for 10 minutes and make sure that the scanners operate smoothly.



21. Adjust the tension in the second scanner wire.

(1) Insert positioning pin [A] in the hole at the front end of the second scanner.
(2) Loosely insert positioning pin [B] in the hole at the rear end of the second scanner.
(3) Loosen the two screws securing the wire tension bracket [C], then turn the 2nd scanner positioning screw [D] clockwise until the rear positioning pin drops and locks in position.
(4) Tighten the two screws securing the wire tension bracket [C].
(5) Make sure the positioning pin [B] slides in and out smoothly. If not, repeat step (3).
(6) Tighten the screws securing the front and rear wire fixing plates [E].



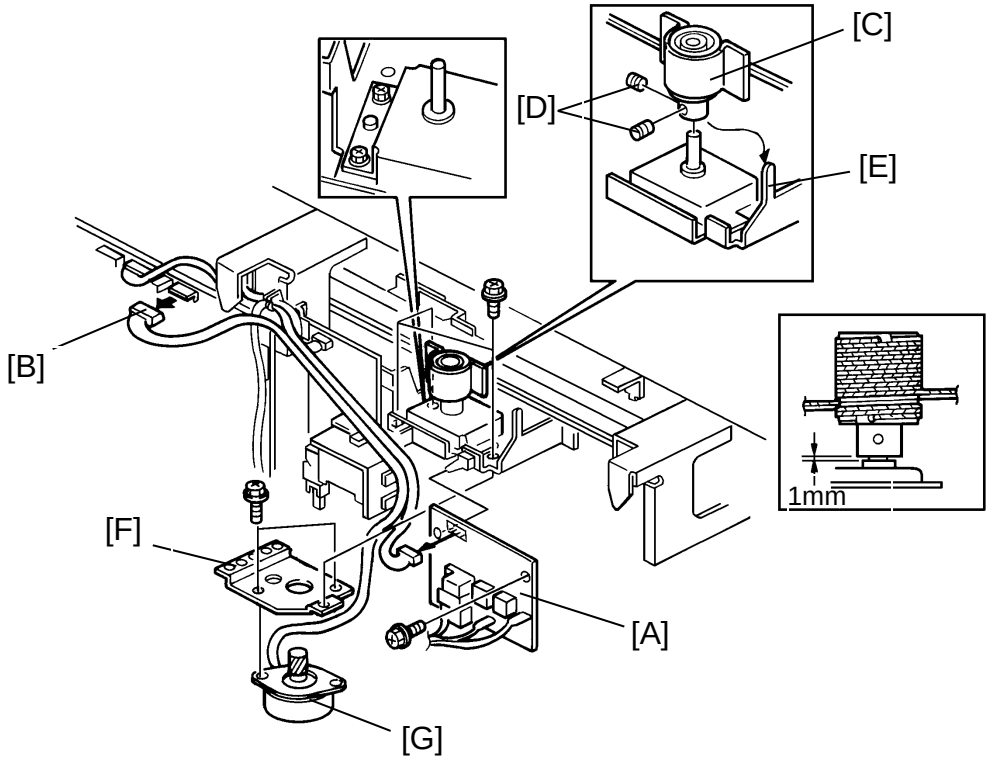
22. Adjust the first scanner wire clamps.

    (1) Loosen the front and rear first scanner wire clamps [A]
    (2) Insert the front and rear positioning pins (2).
    (3) Tighten the wire clamps.

23. Reassemble.

NOTE: Always adjust the first scanner wire clamps after adjusting the tension in the second scanner wire.

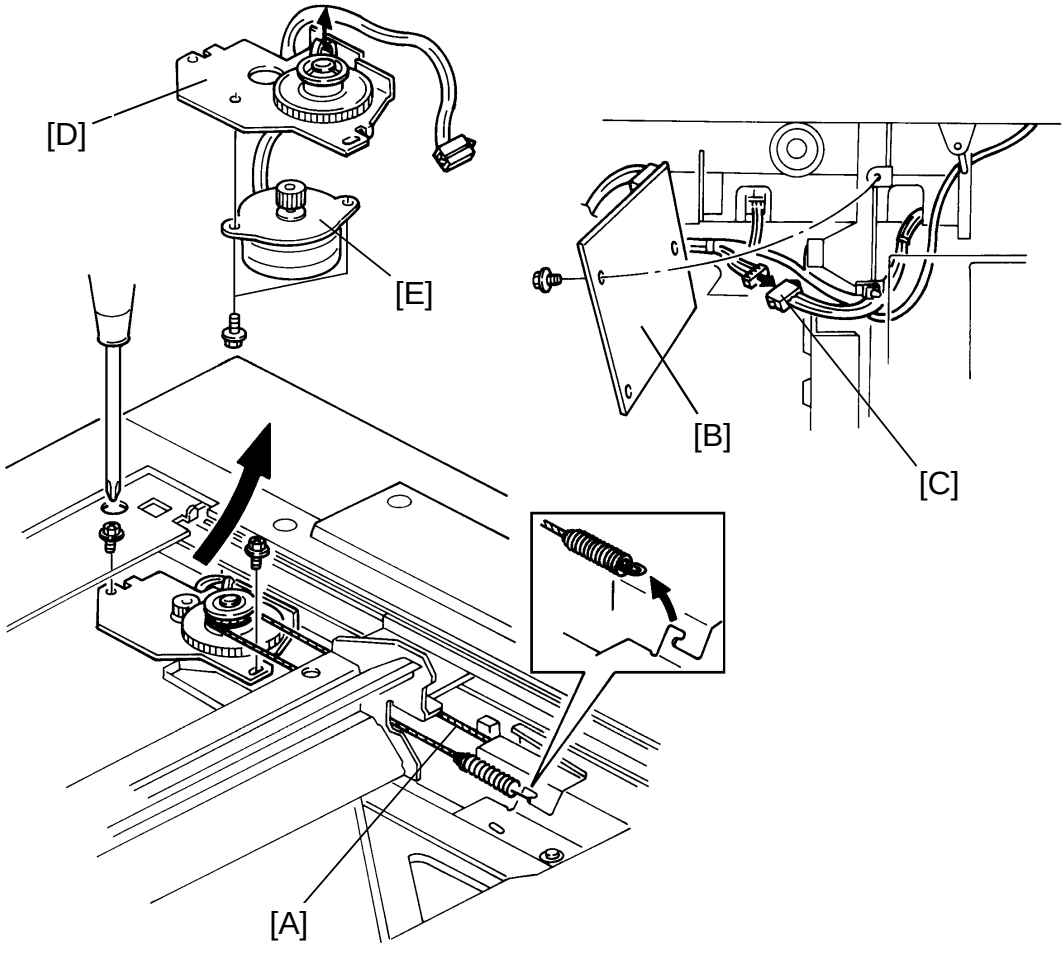
2.8 SCANNER MOTOR REPLACEMENT



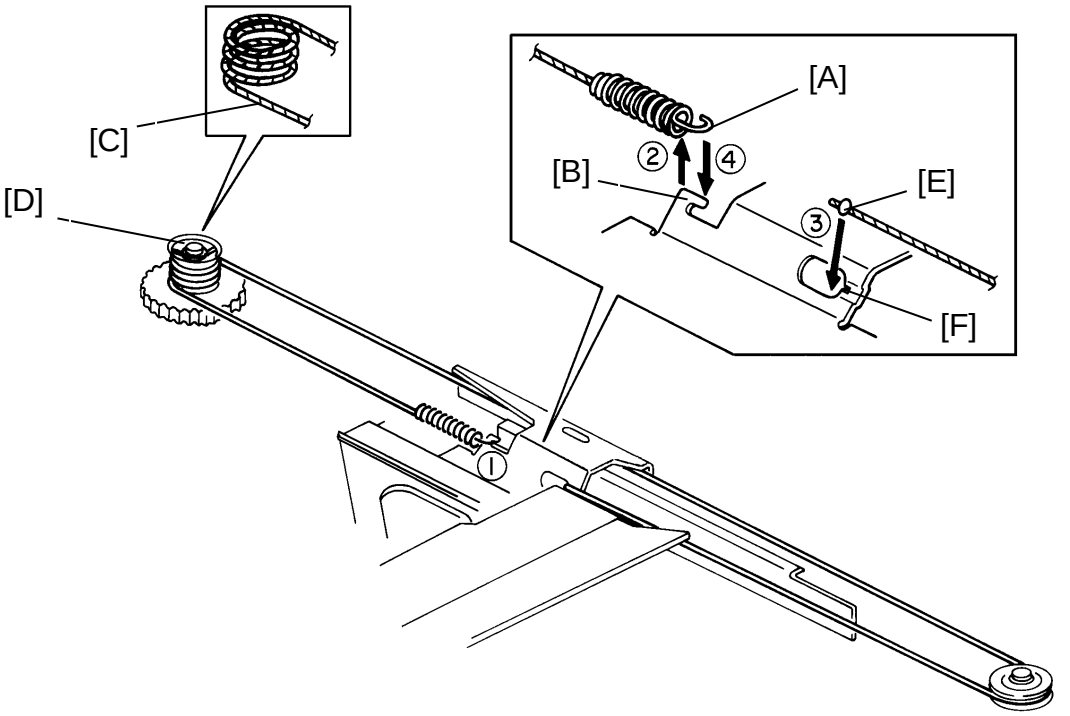
1. Turn off the main switch.
2. Remove the rear cover and the upper cover.
3. Remove the CC/G/B power pack [A] (2 locking supports, 1 screw, and 4 connectors).
4. Remove the 6P connector [B] from the main board and remove the scanner motor harness from the harness clamps.
5. Secure the scanner wire with the omega clamp [C] so that it does not come off the pulley. (Use tape if no clamp is available.)
6. Remove the two Allen screws [D] securing the scanner motor pulley and place it temporarily on bracket [E].
7. Remove the scanner motor bracket [F] (3 screws) and replace the scanner motor [G] (2 screws).

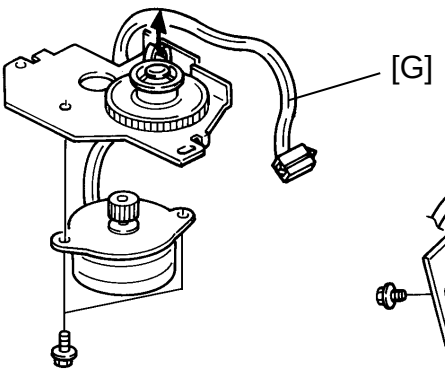
NOTE: Maintain 1mm of clearance between the pulley and the motor. Place the scale (1 mm thick) between the drive pulley and the motor bushing as shown in the above illustration and tighten the Allen screws.

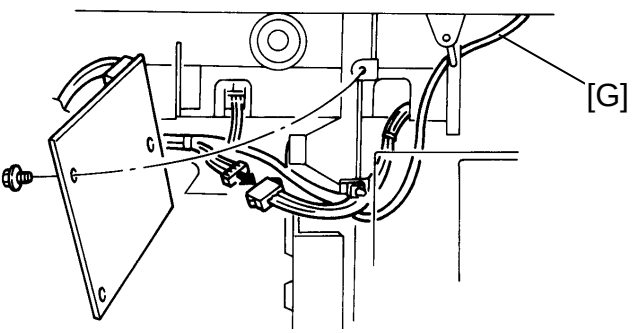
2.9 LENS DRIVE MOTOR REPLACEMENT



1. Turn off the main switch.
2. Remove the exposure glass and the lens cover.
3. Move the scanner to the return side.
4. Remove the tension spring and the lens drive wire [A]. Remove the rear cover and the CC/G/B power pack [B] (2 locking supports and 1 screw).
5. Remove the lens drive motor 6P connector [C].
6. Remove the lens drive motor bracket [D] (2 screws).
7. Remove the motor [E] from the bracket (2 screws), and replace the motor.
8. Reassemble.







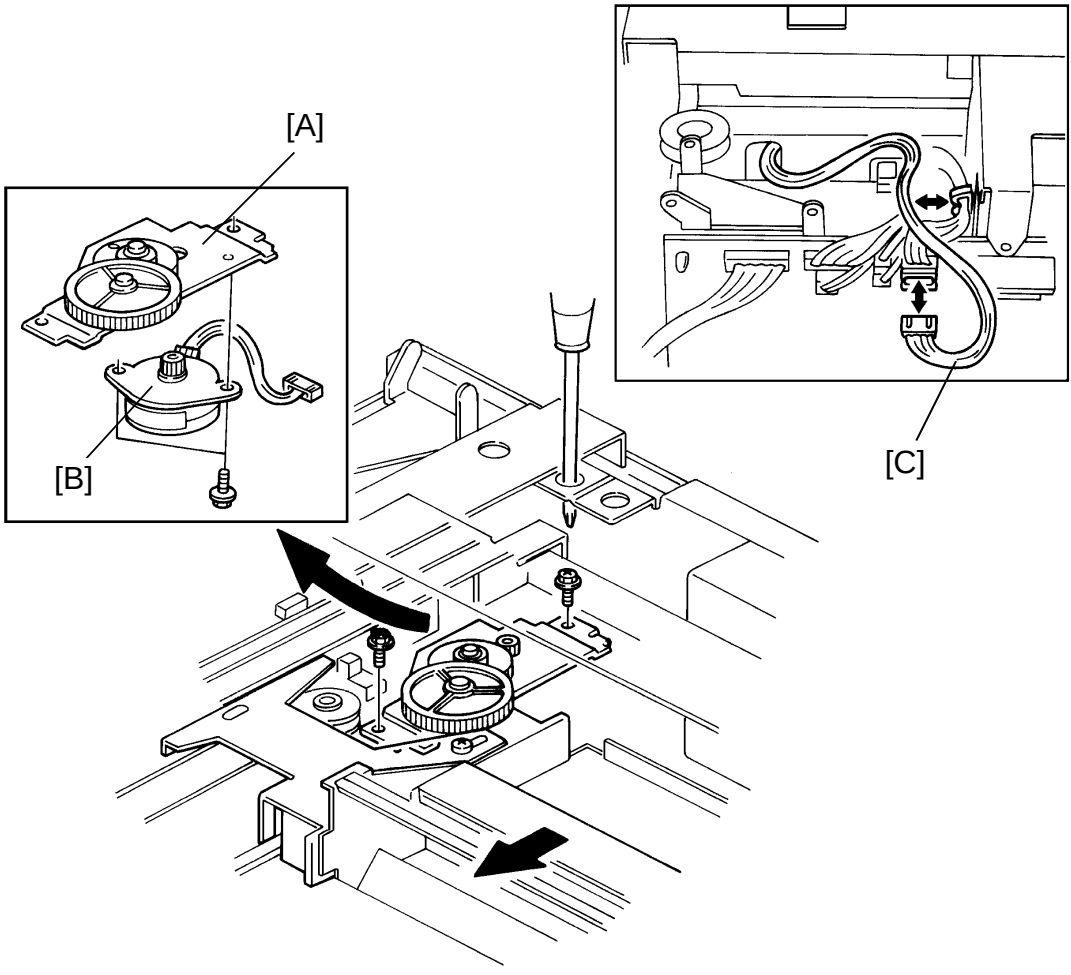
- Lens Drive Wire Installation -

1. Hook the spring [A] to the sensor actuator bracket [B].
2. Wind the lens drive wire [C] three and half times around the pulley [D].
3. Unhook the spring [A] and place the bead [E] at the other end of the wire in slot [F] on the sensor actuator bracket.
4. Reattach the spring to the bracket.

NOTE: a) Rotate the lens drive pulley and make sure that the scanner drive wire moves smoothly.

b) Position the motor harness [G] as shown when installing a new motor.

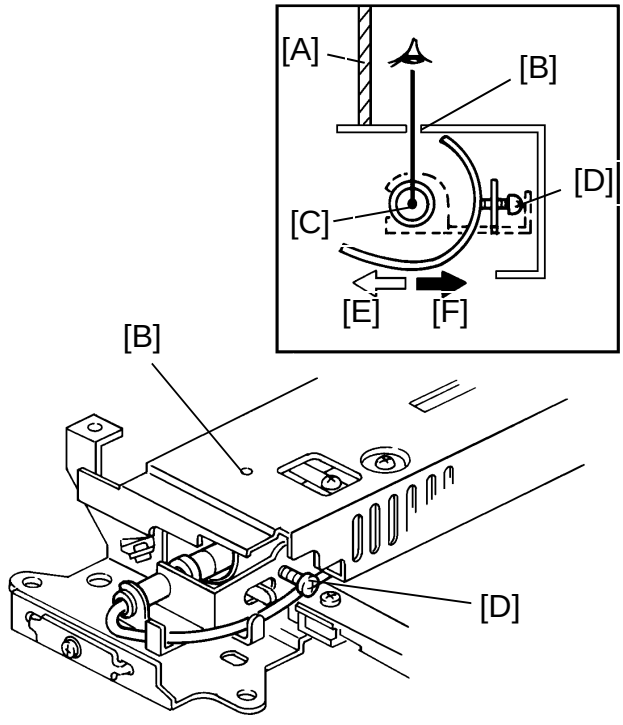
2.10 4TH/5TH MIRROR ASSEMBLY DRIVE MOTOR REPLACEMENT



1. Turn off the main switch.
2. Remove the exposure glass, upper cover, lens cover, and rear cover.
3. Remove the main board.
4. Move the 4th/5th mirror assembly to the left (viewed from the front).
5. Remove the motor bracket [A] (2 screws).
6. Separate the 3rd scanner drive motor [B] from the bracket (2 screws) and replace it.

NOTE: Position the motor harness [C] as shown when installing a new motor.

2.11 EXPOSURE LAMP POSITION ADJUSTMENT (HORIZONTAL DIRECTION)



1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the first scanner to the cutout.
4. Position a scale [A] next to the sight hole [B] in the reflector cover to form a right angle for viewing alignment as shown.
5. Look at the lamp filament [C] through the sight hole in parallel with the scale. The filament should be directly beneath the sight hole.

NOTE: If necessary, use a penlight to illuminate the exposure lamp.

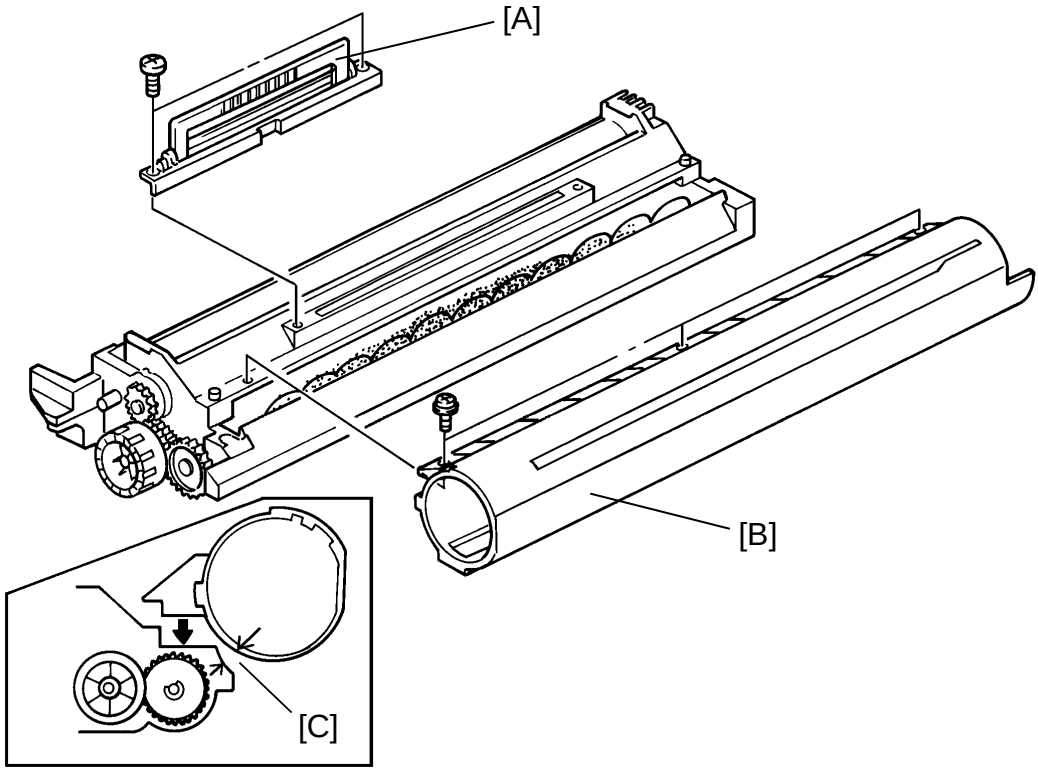
6. Turn screw [D] to adjust the position of the filament.

   Counterclockwise: Filament moves to the left (E direction).

   Clockwise: Filament moves to the right (F direction).

3. DEVELOPMENT AND TONER SUPPLY

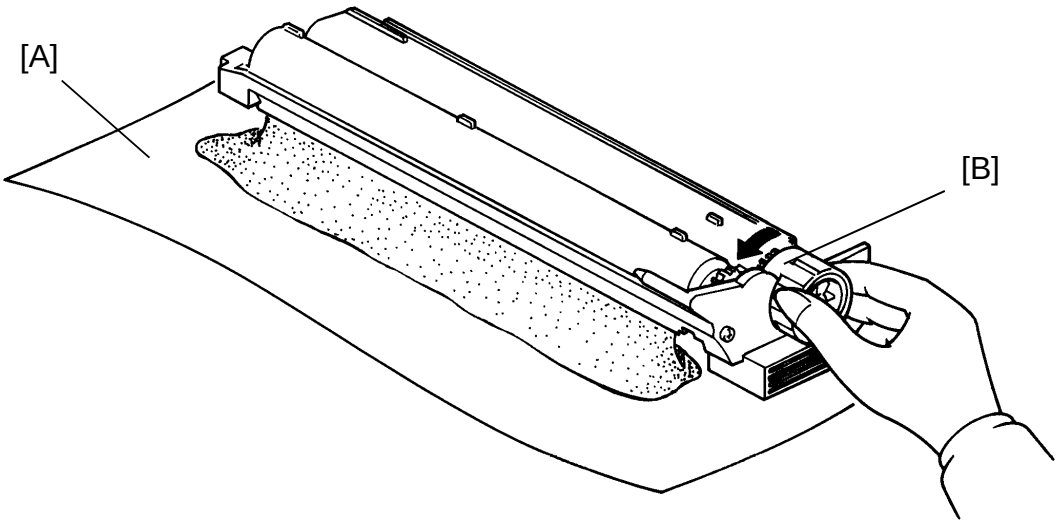
3.1 TONER TANK REMOVAL



1. Take out the development unit.
2. Remove the filter bracket [A] (2 screws).
3. Remove the toner supply unit [B] (3 screws).

NOTE: Make sure that there is no gap [C] between the toner supply unit and the development unit. (See illustration.)

3.2 DEVELOPER REPLACEMENT

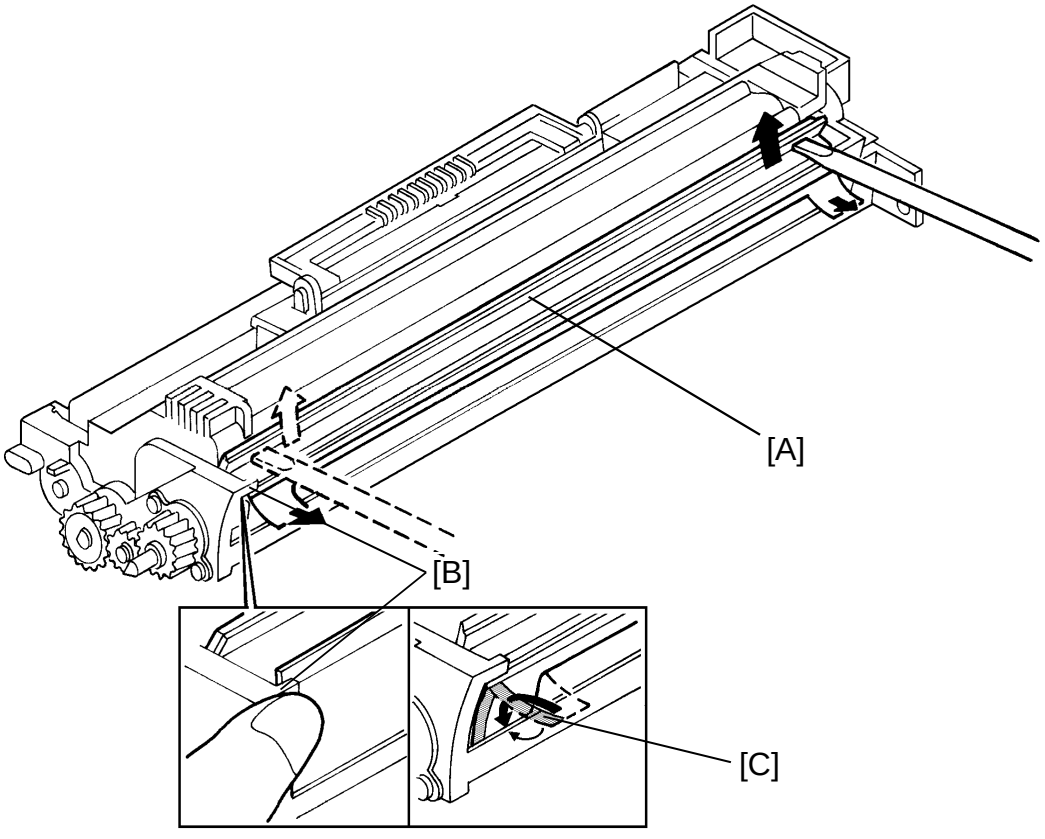


1. Take out the development unit.
2. Set the development unit on a large sheet of paper [A].
3. Remove the toner supply unit (3 screws). (See Toner Supply Unit Removal.)
4. Turn the paddle roller knob [B] counterclockwise to empty developer onto the paper.

   NOTE: Dispose of the used toner according to local regulations.
5. Make sure that no developer remains on the development roller or in the development unit.
6. Pour one pack of developer into the development unit while turning the paddle roller knob.
7. Reinstall the toner tank and set the development unit in the machine.
8. Confirm using SP mode #54 that Vsg is 4 ± 0.2 volts .
   If not, adjust Vsg. (See ID Sensor Adjustment.)
9. Perform initial setting for new black or color developer using the following SP modes:

Black	Color
SP Mode #65	SP Mode #10

3.3 INLET SEAL REMOVAL



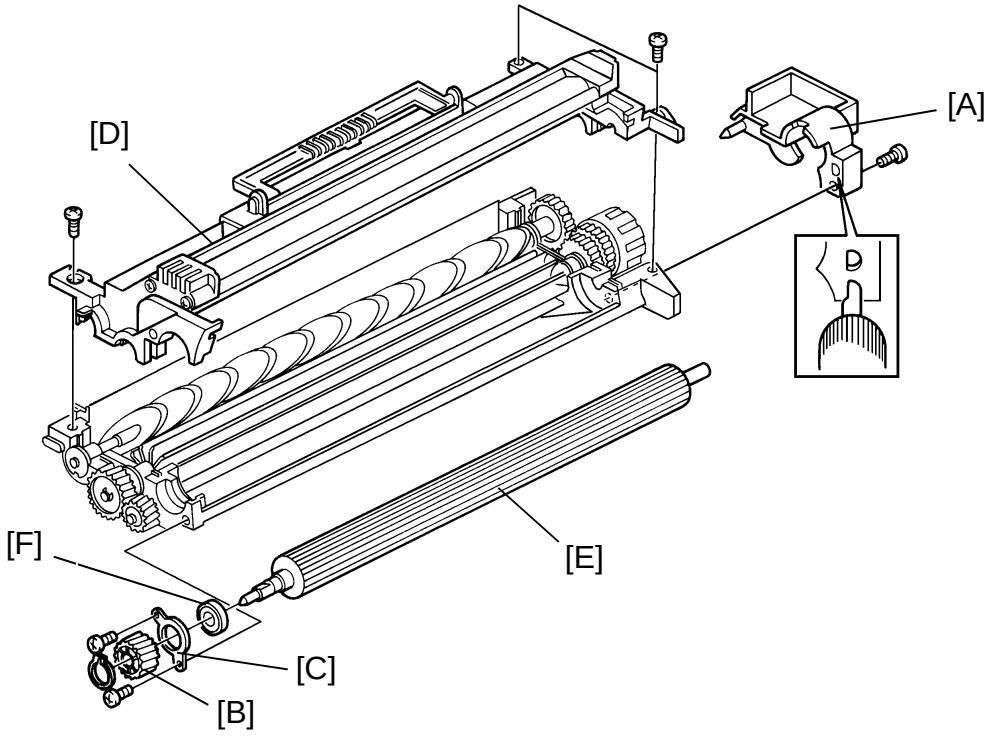
1. Take out the development unit.
2. Remove the inlet seal plate [A] by working a small blade screwdriver along the edge of the plate while pressing the stoppers [B] with one finger as shown.

NOTE: a) Be careful not to damage the stoppers [B] when removing the inlet seal plate.

b) The inlet seal plate must be replaced (i.e. a new plate must be installed) when it is removed to adjust the doctor gap or to replace the development roller.

c) To install a new inlet seal plate, remove the covering from the 2-sided tape [C] and affix the inlet seal [D] to the development unit lower casing. Tuck both ends of the seal inside the lower casing as shown.

3.4 DEVELOPMENT ROLLER REPLACEMENT

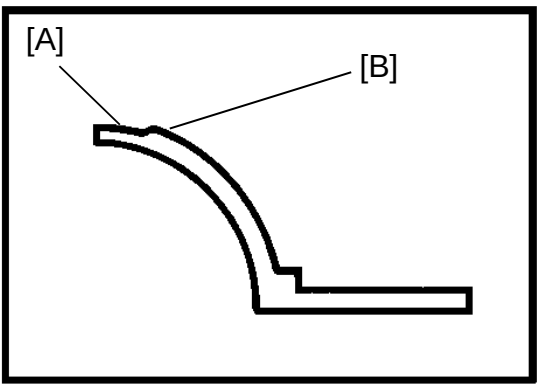


1. Take out the development roller and remove the toner tank. (See Toner Tank Removal.)
2. Empty the developer from the development unit onto a clean sheet of paper. Keep the developer clean for later use; do not allow it to be contaminated by foreign material.
3. Remove the development roller positioning bracket [A] (2 screws).
4. Remove the inlet seal plate. (See Inlet Seal Plate Removal.)
5. Remove the development roller gear [B] (1 C-ring).
6. Remove the bearing retainer [C] (2 screws).
7. Remove the upper case [D] (3 screws).
8. Remove the development roller [E] with bearing [F].
9. Replace the development roller.

NOTE: a) When replacing the development roller, use a blower brush to remove any carrier from the bearing, inlet seal plate, etc.

b) After reassembling the development unit, make sure that the DG gap is within 0.6 ± 0.07 mm. (See Doctor Gap Adjustment.)

3.5 DOCTOR GAP ADJUSTMENT



NOTE: a) Use a doctor gap gauge (P/N #A0489500) to measure the doctor gap. This gauge has a "GO" [A] and a "NO GO" section [B].

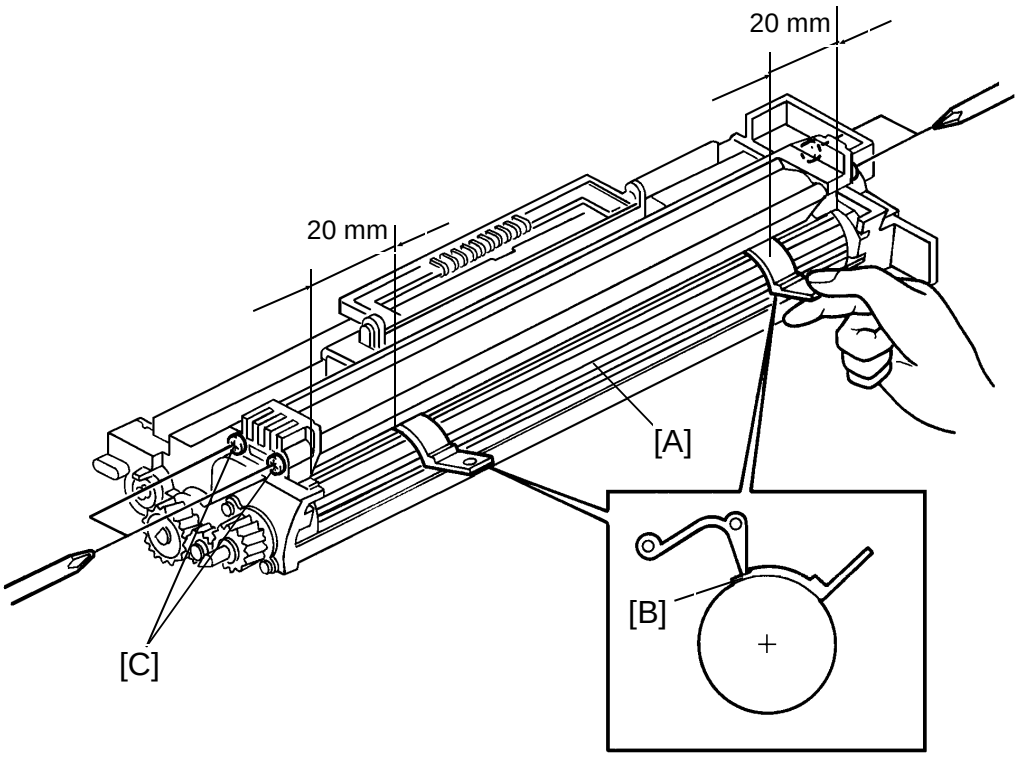
b) Doctor gap adjustment is required whenever the development unit is disassembled or the doctor plate is replaced.

CAUTION: Clean the development roller before starting the adjustment procedure. This prevents surface damage to the roller and ensures an accurate adjustment.

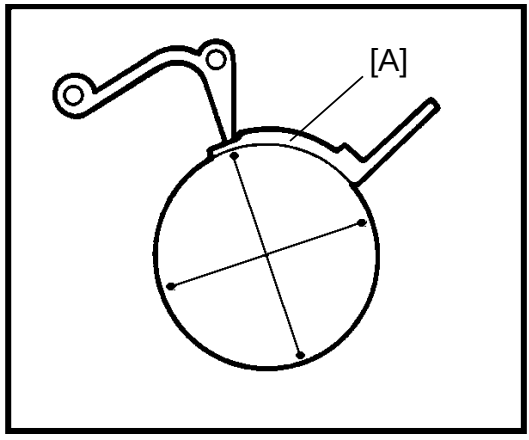
ADJUSTMENT STANDARD: 0.6 ± 0.07 mm (0.024" ± 0.003")

- Adjustment Procedure -

1. Take out the development unit and remove the toner supply unit. (See Toner Supply Unit Removal.)
2. Remove the developer.
3. Remove the development roller positioning bracket and the inlet seal plate (See Inlet Seal Plate Removal.)



4. Clean all developer from the development roller [A] with a vacuum cleaner. Turn the roller to make sure that it is free of developer.
5. Loosen the doctor plate (4 screws).
6. Insert the"GO" gauge [B] in the doctor gap 20mm from the rear side of the development roller as shown.
7. Press down the doctor plate, and tighten the rear doctor plate screws [C].
8. Repeat the adjustment procedure at the front side of the development roller.
9. Check the doctor gap (procedure on next page).



- Confirmation Procedure -

1. Carefully follow the procedure given here to correctly measure the doctor gap.

   (1) Insert the gauge [A] into the doctor gap 20mm from the front end of the development roller.

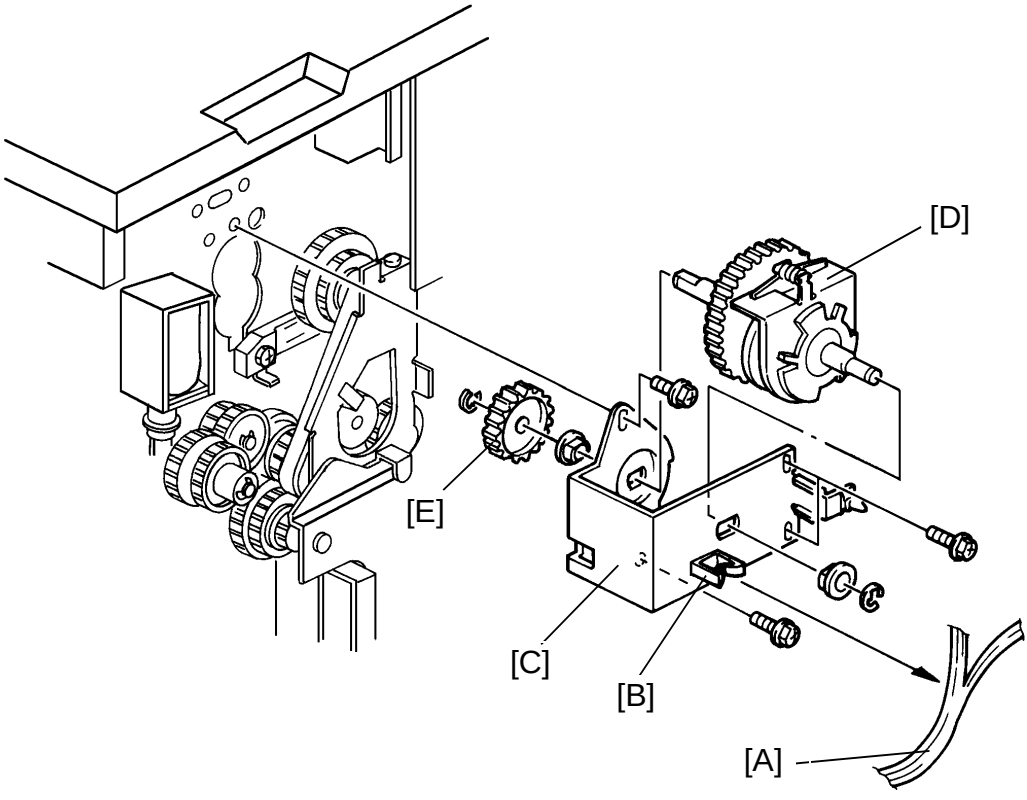
   (2) Check the doctor gap at three other points 20mm from the front end of the development roller, turning the roller 90° each time.

   (3) Repeat steps (1), (2), and (3) for the rear side of the development roller.

2. When the gap is 0.53 - 0.67 mm at three points on each side, the gap has been adjusted properly.

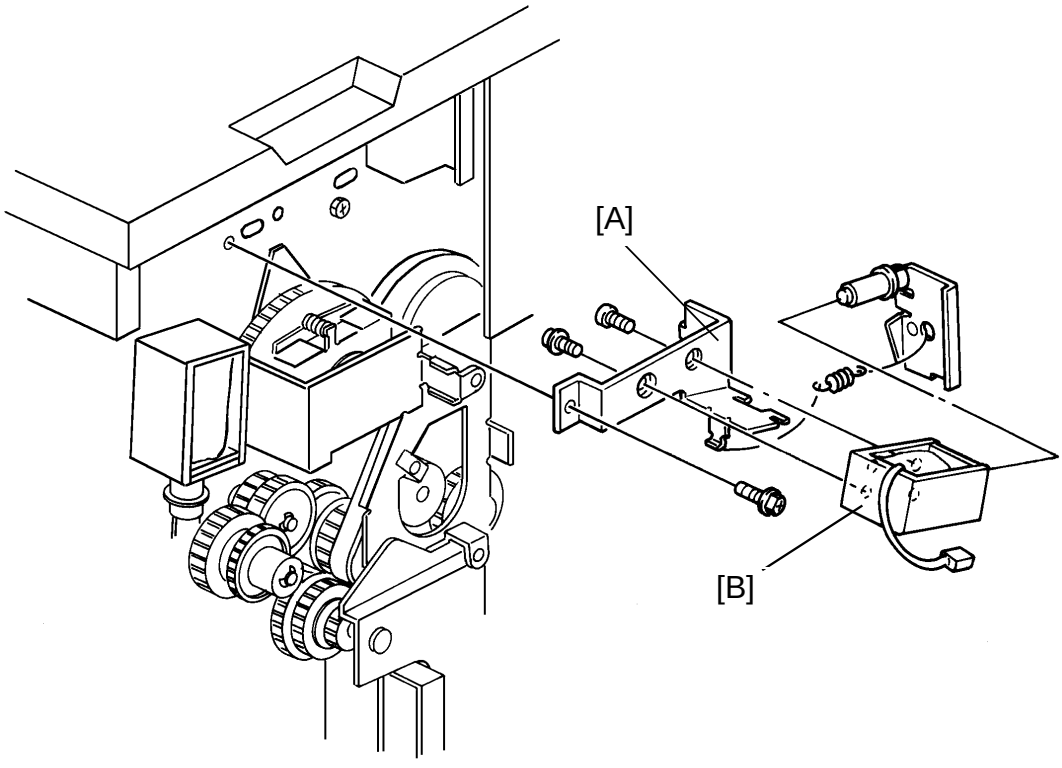
3. If the gap is out of specification at more than one point on either side, repeat the adjustment procedure.

3.6 TONER SUPPLY CLUTCH SOLENOID REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover and main board (all connectors and 5 locking supports).
3. Remove the color switch harness [A] from the clamp [B].
4. Remove the toner supply clutch solenoid bracket [C] (4 screws).
5. Replace the clutch solenoid [D] (2 E-rings, bushings, and 1 gear[E]).

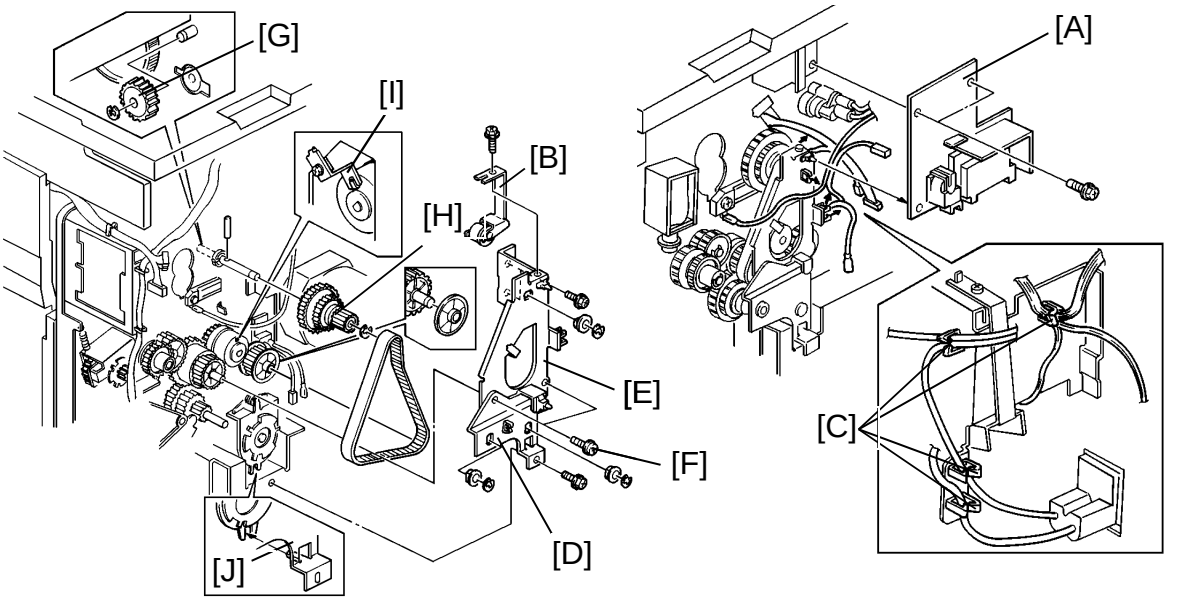
3.7 DEVELOPMENT DRIVE CLUTCH SOLENOID REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover and main board (all connectors and 5 locking supports).
3. Remove the clutch solenoid bracket [A] (1 screw).
4. Replace the solenoid [B] (2 screws).

NOTE: Reinstall the solenoid on the bracket [A] so that the harness is positioned on the upper side as shown.

3.8 DEVELOPMENT DRIVE CLUTCH REPLACEMENT



1. Remove the following parts:

   - Front cover
   - Cleaning unit
   - Drum unit
   - Main board
   - Development drive clutch solenoid
   - Development unit
   - Charge corona unit
   - Rear cover
   - Toner supply clutch solenoid

2. Remove the TC&SC power pack [A] (2 locking supports and screws).
3. Remove the timing belt tightener [B] (1 screw).
4. Remove the harnesses from the clamps [C] on the frames as shown.
5. Remove the big and small frames [D and E] (3 E-rings, bushings, and 6 screws).

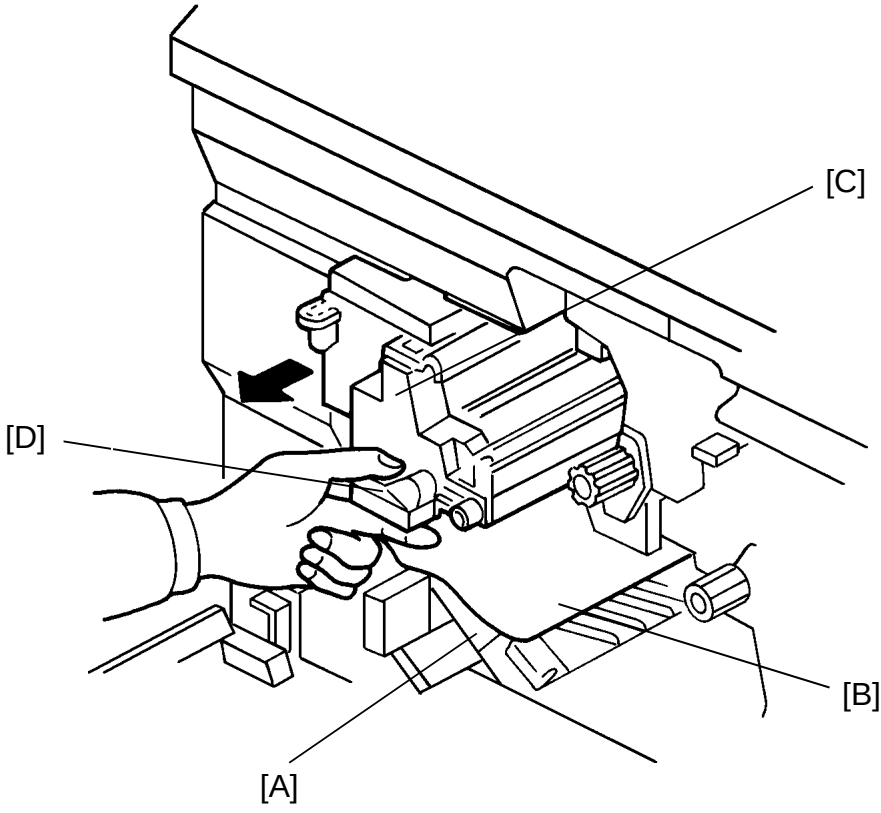
   Screws : 4 tapping screws and 2 screws with washer [F].

6. Remove the development drive gear [G] (1 E-ring) from the front side.
7. Replace the drive clutch [H] (1 E-ing and parallel pin).

NOTE: When reassembling, make sure of the following:
a) The timing belt fits correctly onto the sprockets.
b) Stopper [I] locks the registration clutch.
c) Stopper [J] locks the 2nd feed roller clutch solenoid.
d) The harnesses do not pass between the frames.

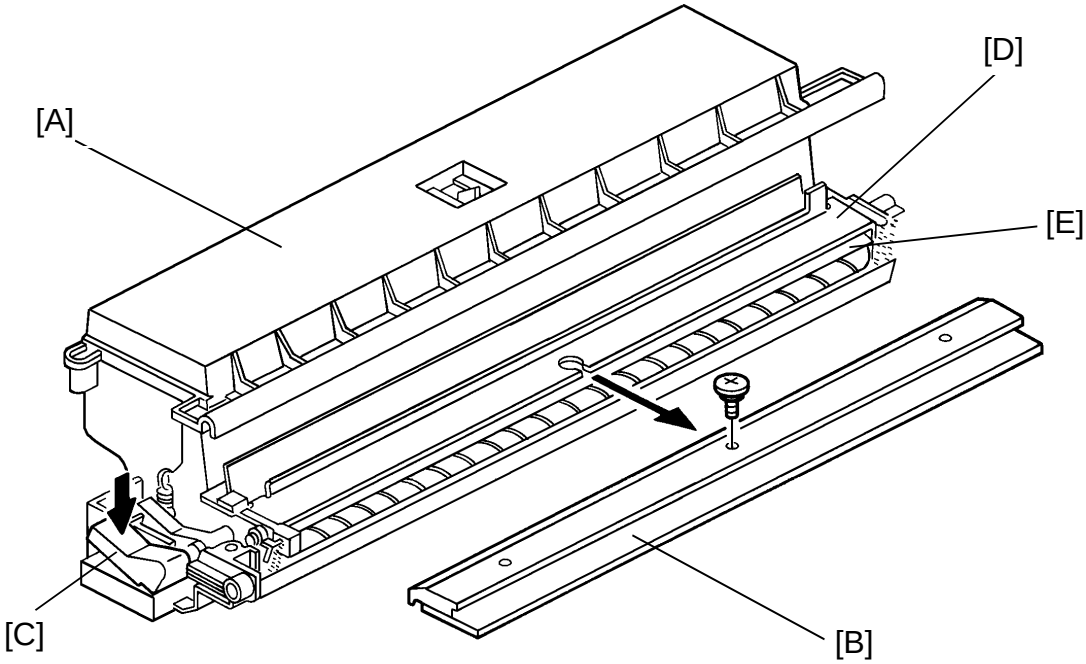
4. CLEANING

4.1 CLEANING UNIT REMOVAL



1. Open the front cover.
2. Lower the transport unit [A].
3. Place a sheet of paper [B] underneath the cleaning unit [C].
4. While holding down the cleaning blade release lever [D], remove the cleaning unit.

4.2 CLEANING BLADE REPLACEMENT

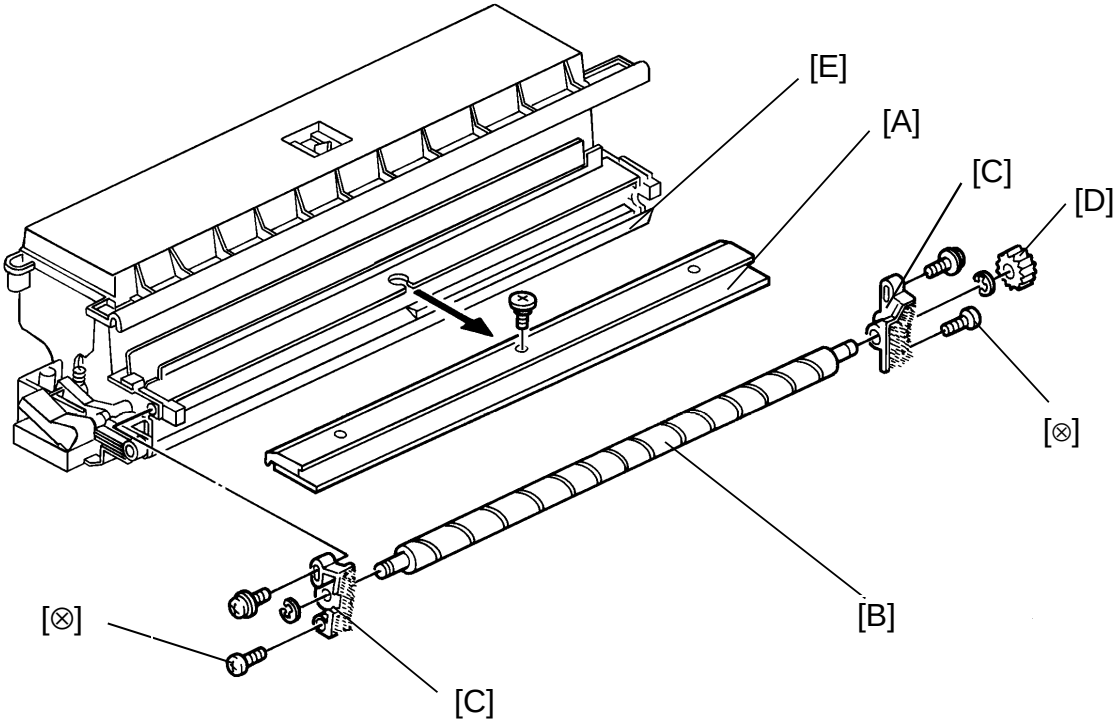


1. Remove the cleaning unit [A]. (See Cleaning Unit Removal.)
2. Remove the cleaning blade [B] (1 screw).
3. While holding down the cleaning blade release lever [C], install the new cleaning blade between the blade bracket [D] and the blade scraper [E] (collar screw).

NOTE: a) Do not touch the edge of a new cleaning blade, as it is damaged easily.

b) After installing a new cleaning blade, make sure it swivels.

4.3 CLEANING BRUSH REPLACEMENT



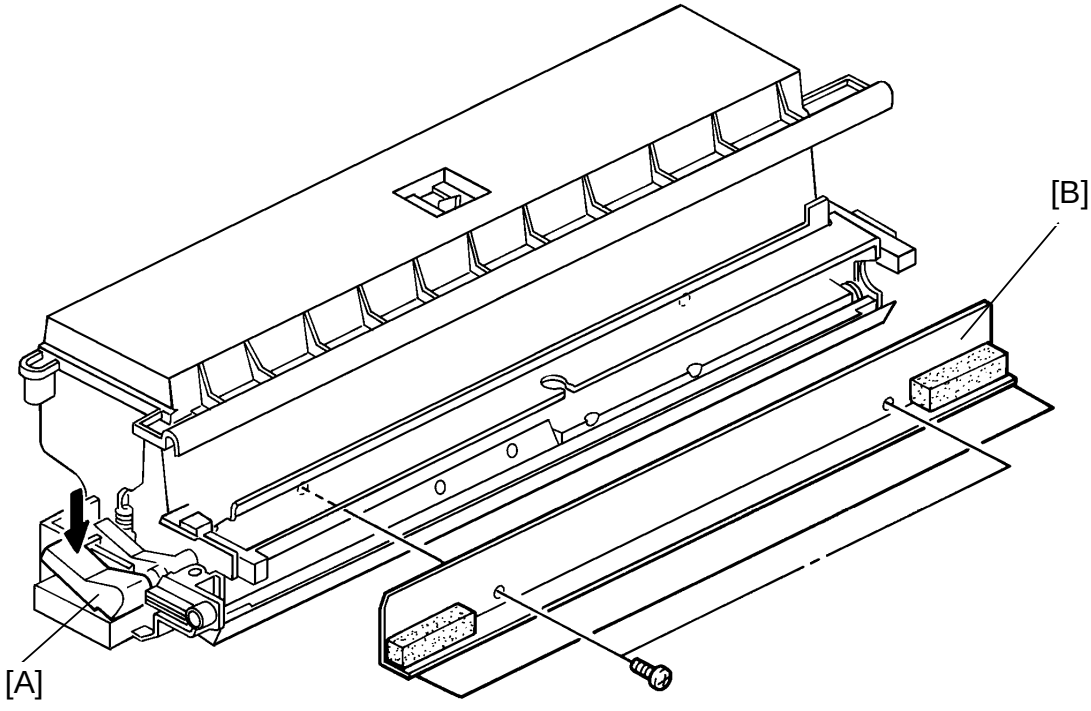
1. Remove the cleaning blade [A]. (See Cleaning Blade Replacement.)
2. Remove the cleaning brush bracket screws (4); then, remove the cleaning brush [B] together with the cleaning side brackets [C] and gear [D].
3. Remove the gear and the two E-rings, and replace the cleaning brush.

NOTE: a) Do not touch the cleaning brush surface. Handle only the shaft-ends.

b) Do not bend or damage the entrance seal [E].

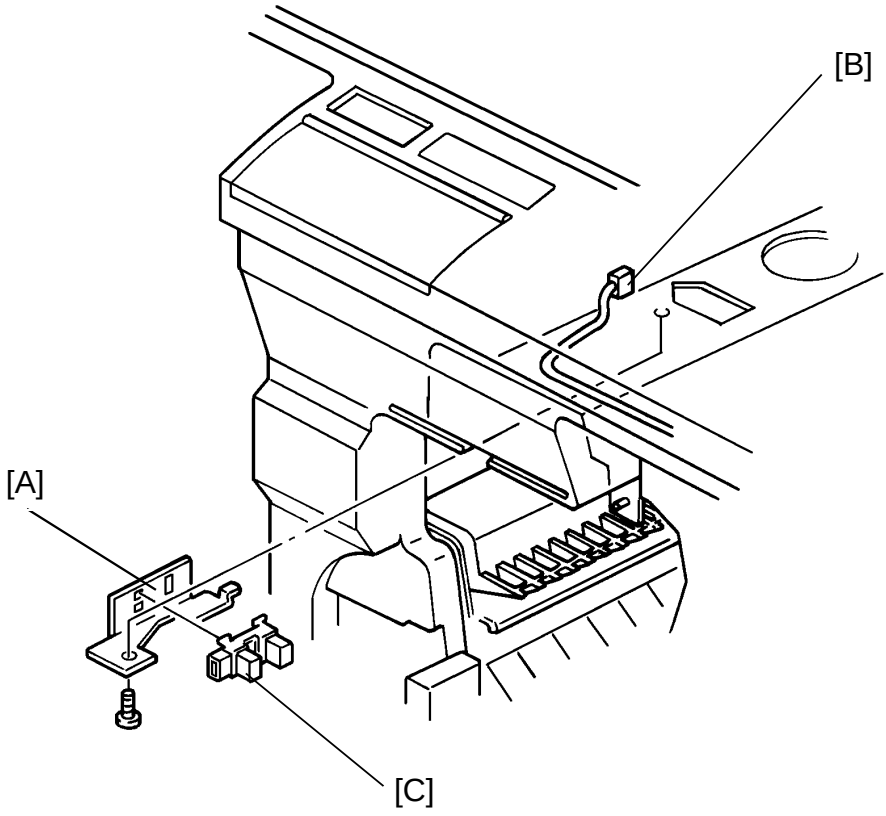
c) These screws [⊗] are tapping screws. Do not tighten them too much as this will strip the resin threads.

4.4 BLADE SCRAPER REPLACEMENT



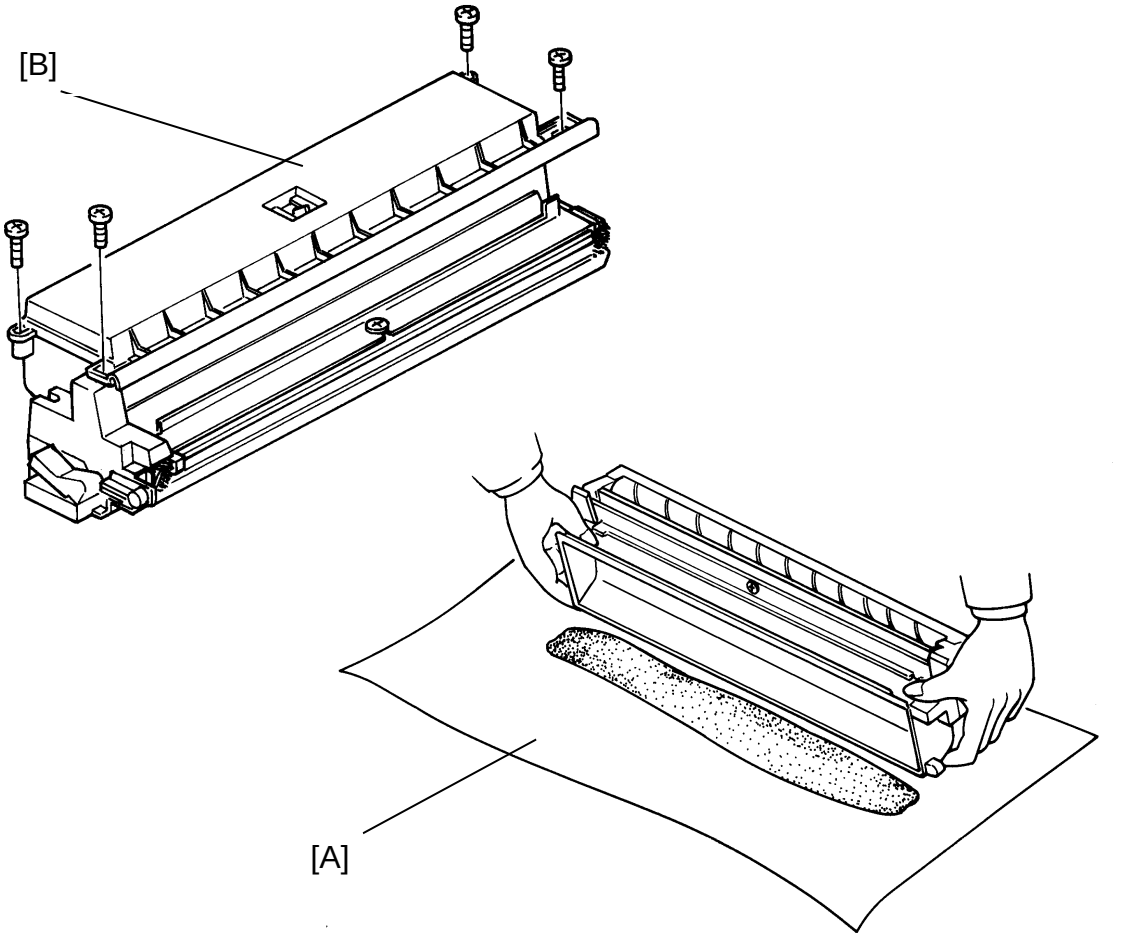
1. Remove the cleaning blade and brush. (See Cleaning Blade and Brush Replacement.)
2. While holding down the cleaning blade release lever [A], remove the blade scraper [B] (2 screws).

4.5 TONER OVERFLOW SENSOR REPLACEMENT



1. Remove the cleaning unit.
2. Lower the transport unit.
3. Remove the toner overflow sensor bracket [A] from the duct bracket (1 screw).
4. Disconnect the connector [B] and remove the toner overflow sensor [C] from the bracket (1 screw).

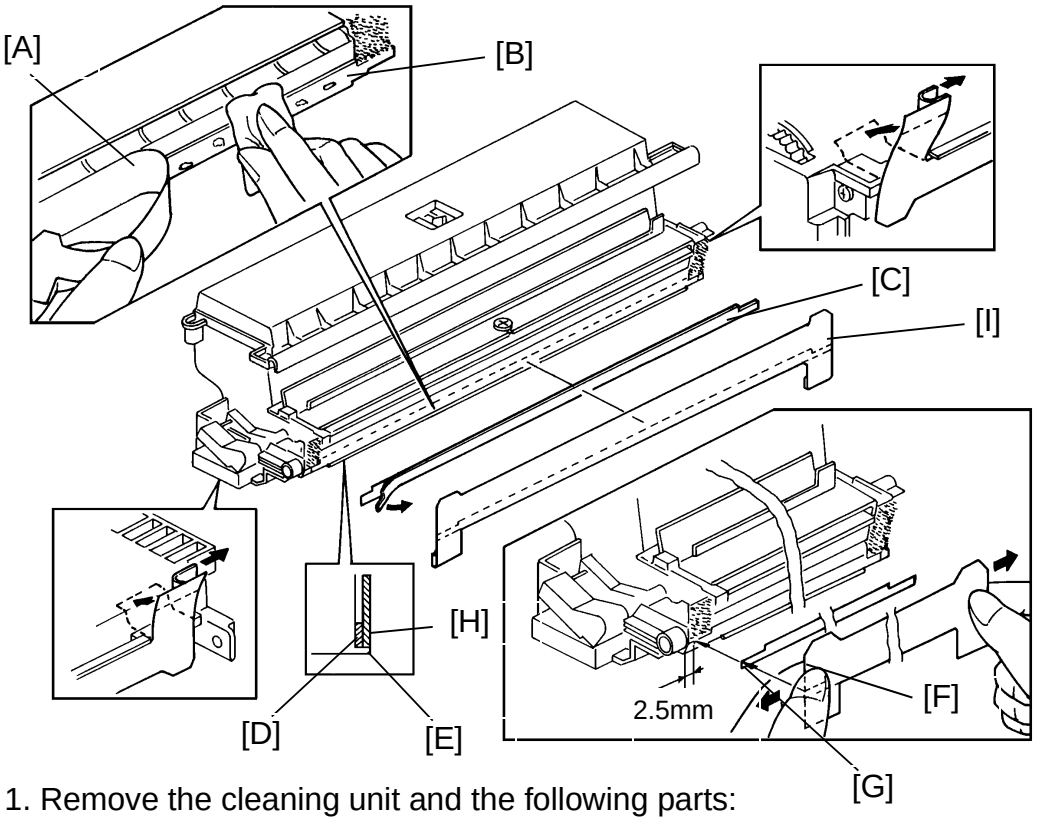
4.6 USED TONER COLLECTION



1. Remove the cleaning unit.
2. Set the cleaning unit on a large sheet of paper [A].
3. Remove the toner collection cover [B] (4 screws).
4. Pour the used toner slowly onto the paper sheet so that the toner does not scatter.
5. Place the paper sheet with the toner into a vinyl bag.

NOTE: Dispose according to local regulations.

4.7 ENTRANCE SEAL REPLACEMENT



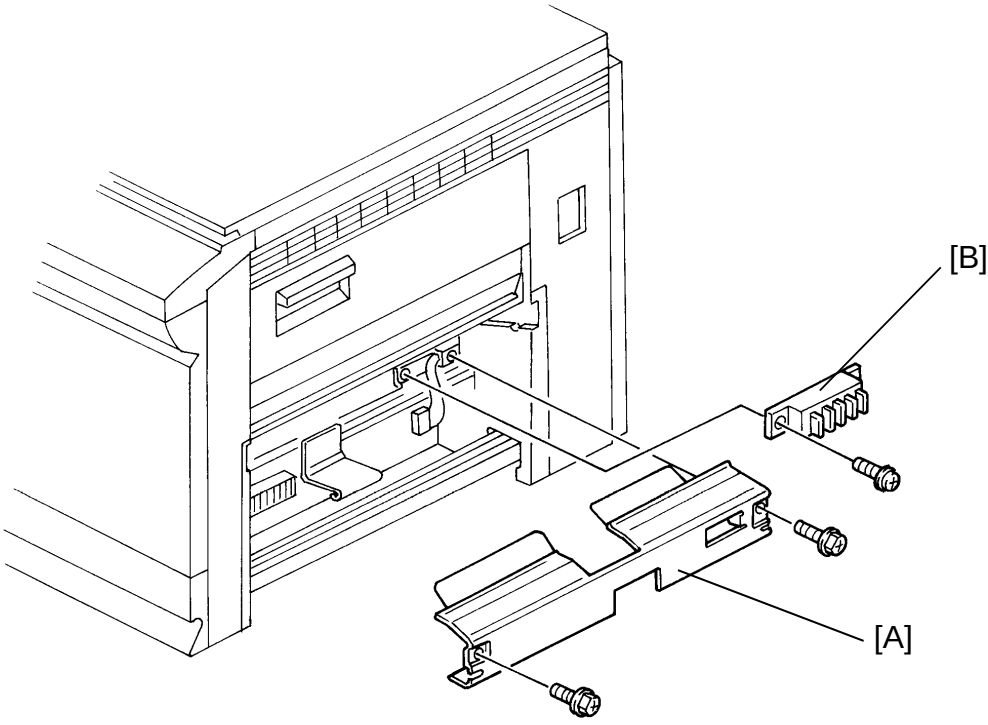
1. Remove the cleaning unit and the following parts:
   - Cleaning Blade
   - Cleaning Brush
2. Remove the used toner. (See Used Toner Collection.)
3. Clean the cleaning unit with a vaccum cleaner.
4. Remove the entrance seal [A] together with the strip of 2-sided tape securing it to the lower casing.
5. Clean the lower casing [B] with alcohol; make sure that no tape remains on the casing surface.
6. Place a new strip of 2-sided tape [C] on the lower casing surface. The lower edge [D] of the tape must be flush with the edge [E] of the projection as shown in the illustration.
7. Place the new entrance seal on the 2-sided tape. Extend the seal so that both edges [F] align with the edges [G] of the tape.

NOTE: a) The lower edge [H] of the entrance seal must be aligned with the edge [E] of the projection on the lower casing.

b) Make sure that there are no waves in the upper edge [I] of the entrance seal.

5. PAPER FEED

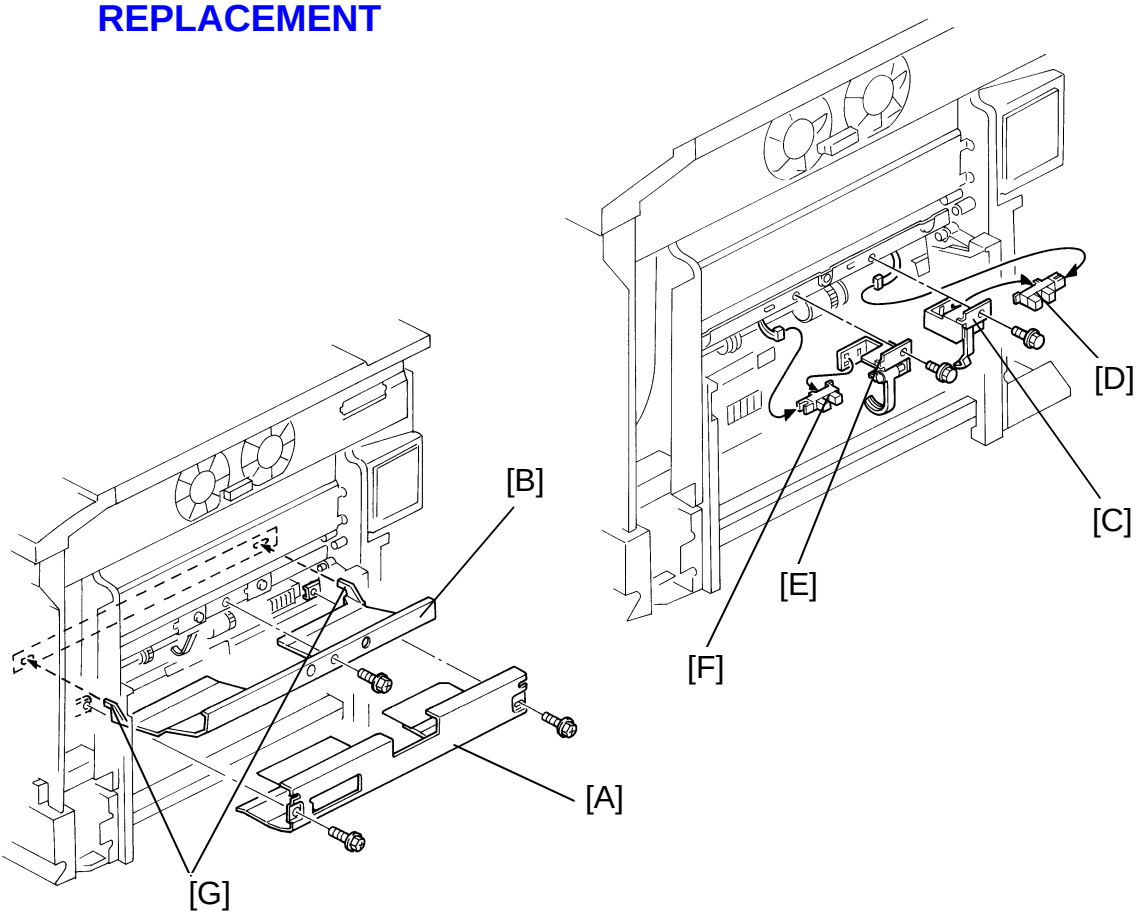
5.1 PAPER SIZE SWITCH REPLACEMENT



1. Turn off the main switch.
2. Remove the paper feed lower guide plate [A] (2 screws).
3. Remove the size switch [B] from the paper feed station (1 screw).
4. Pull the size switch out slightly and unhook the connector. Remove the size switch.

NOTE: After connecting the new switch to the connector, take up slack in the switch harness by pulling on it from the rear side of the copier.

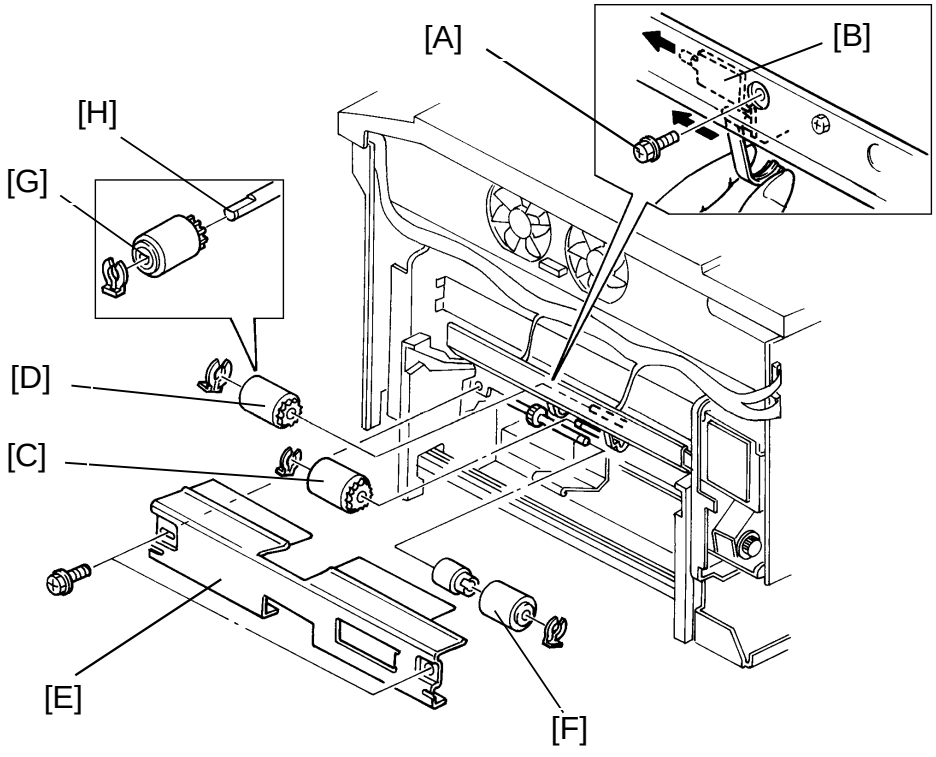
5.2 1ST PAPER END SENSOR AND PAPER LIFT SENSOR REPLACEMENT



1. Turn off the main switch.
2. Remove the manual feed table. (See Manual Feed Table Removal.)
3. Remove the paper feed lower guide bracket [A] (2 screws).
4. Remove the paper feed upper guide bracket [B] (1 screw).
5. Remove the 1st paper end sensor bracket [C] (1 screw).
6. Replace the 1st paper end sensor [D] (1 connector).
7. Remove the paper lift sensor bracket [E] (1 screw).
8. Replace the paper lift sensor [F] (1 connector).

NOTE: When installing the paper feed upper guide plate, make sure that the hooks [G] fit into the holes as shown.

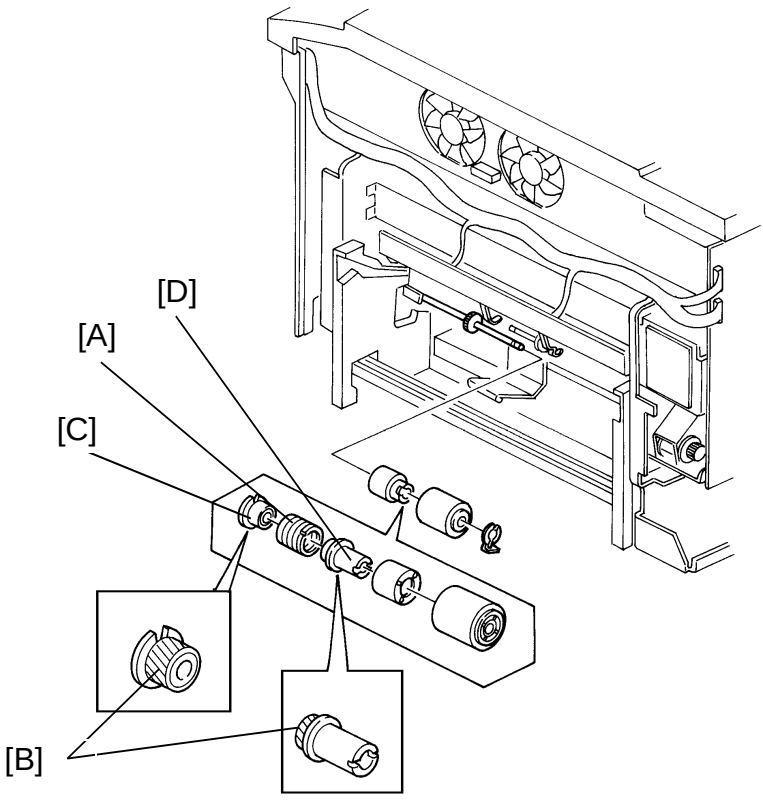
5.3 1ST FEED ROLLER, PICK-UP ROLLER, AND REVERSE ROLLER REPLACEMENT



1. Turn off the main switch.
2. Open the manual feed table.
3. Remove the screw [A] securing the paper lift sensor bracket [B].
4. Close the manual feed table.
5. Slide the sensor bracket in the direction of the arrow.
6. Replace the pick-up roller [C] (1 small snap-ring).
7. Replace the feed roller [D] (1 snap-ring).
8. Remove the paper feed lower guide bracket [E] (2 screws).
9. Replace the reverse roller [F] (1 small snap-ring).

NOTE: a) Snap-rings come in two sizes; the larger of the two is used on the feed roller.

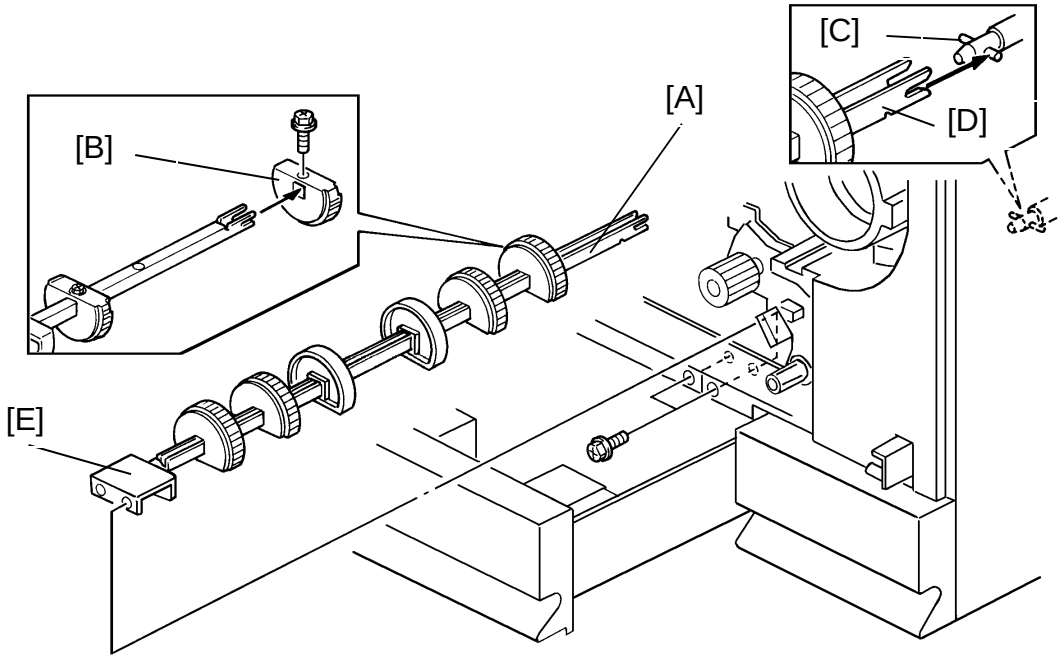
b) Flat faces [G] and [H] of the feed roller and shaft must be aligned.



- To install -

1. Clean the rollers with a damp cloth.
2. Clean the clutch spring [A] of the reverse roller.
3. Lubricate the surface [B] of the output hub [C] and input hub [D] with Mobil Temp. 78.

5.4 2ND PAPER FEED ROLLER REPLACEMENT



1. Turn off the main switch.
2. Open and remove the front cover.
3. Pull out the paper tray or the duplex tray.
4. Remove the feed roller assembly [A] (2 screws).
5. Replace the feed roller [B] (1 screw each).

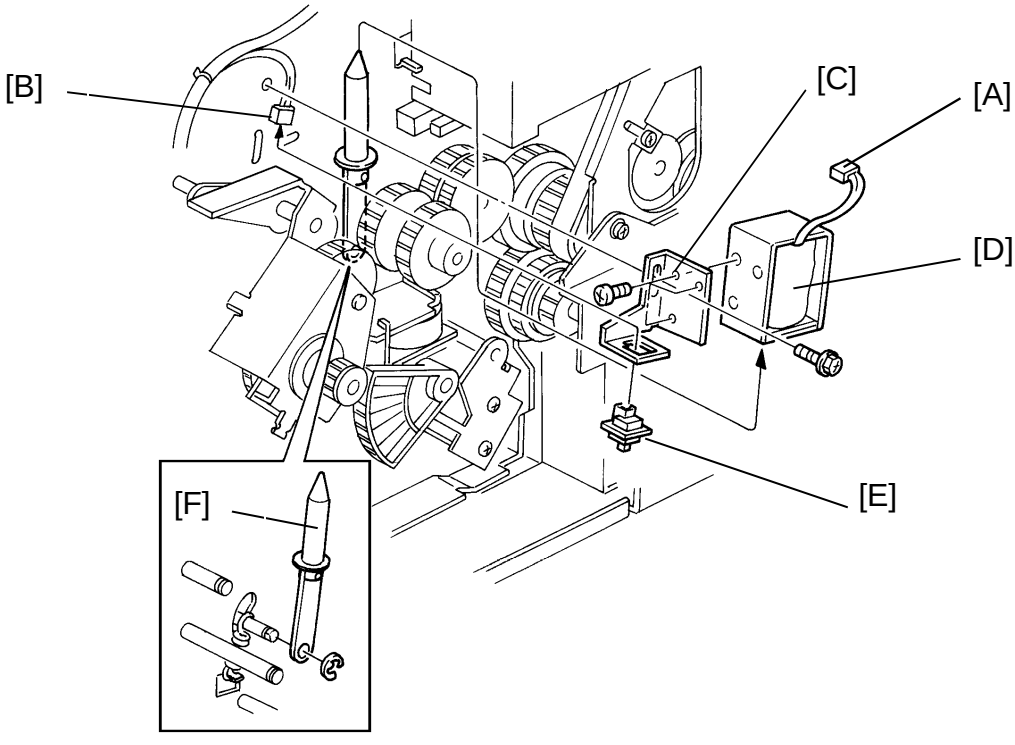
NOTE: When reinstalling the feed roller assembly, make sure of the following:

a) The feed rollers face up as shown.

b) The pins [C] on the end of the drive shaft fit into the slots [D] on the end of the feed roller shaft.

c) Surface [E] of the bracket faces up.

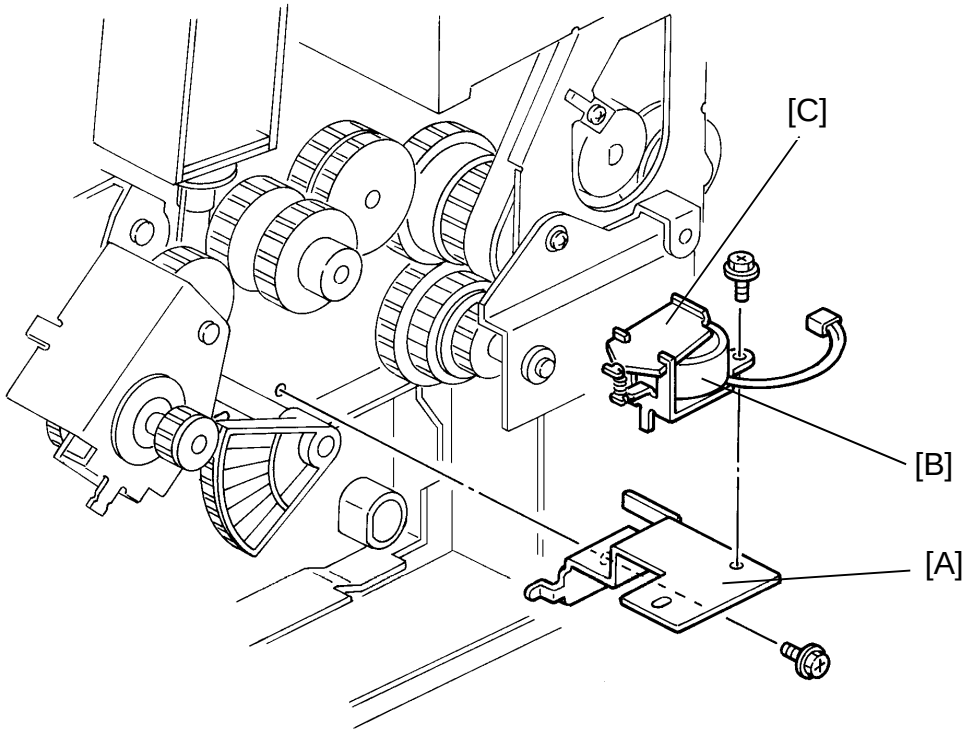
5.5 PICK-UP ROLLER RELEASE SOLENOID AND MANUAL FEED TABLE SWITCH REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the main board (5 locking supports and all connectors).
4. Disconnect the connectors [A and B] of the solenoid and switch.
5. Remove the solenoid bracket [C] (1 screw).
6. Replace the solenoid [D] (3 screws) or switch [E].

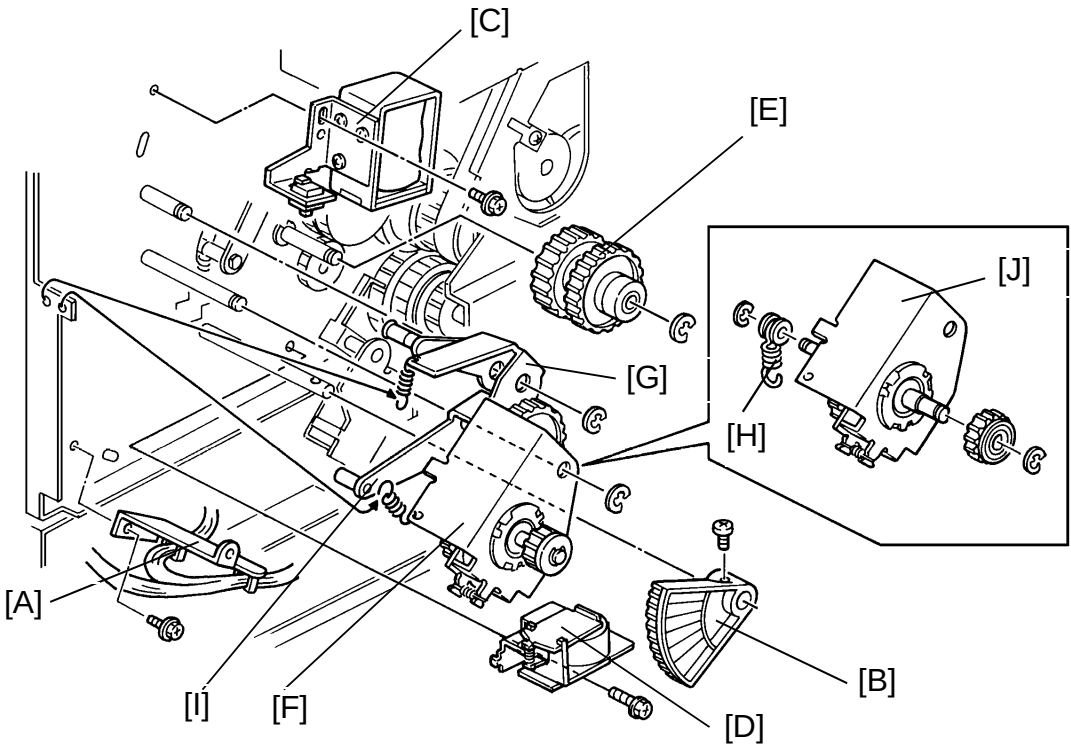
NOTE: Before replacing the plunger [F] (1 E-ring), first remove the paper lift clutch solenoid assembly. (See Paper Lift Clutch Solenoid Assembly Replacement.)

5.6 1ST FEED ROLLER SPRING CLUTCH SOLENOID REPLACEMENT

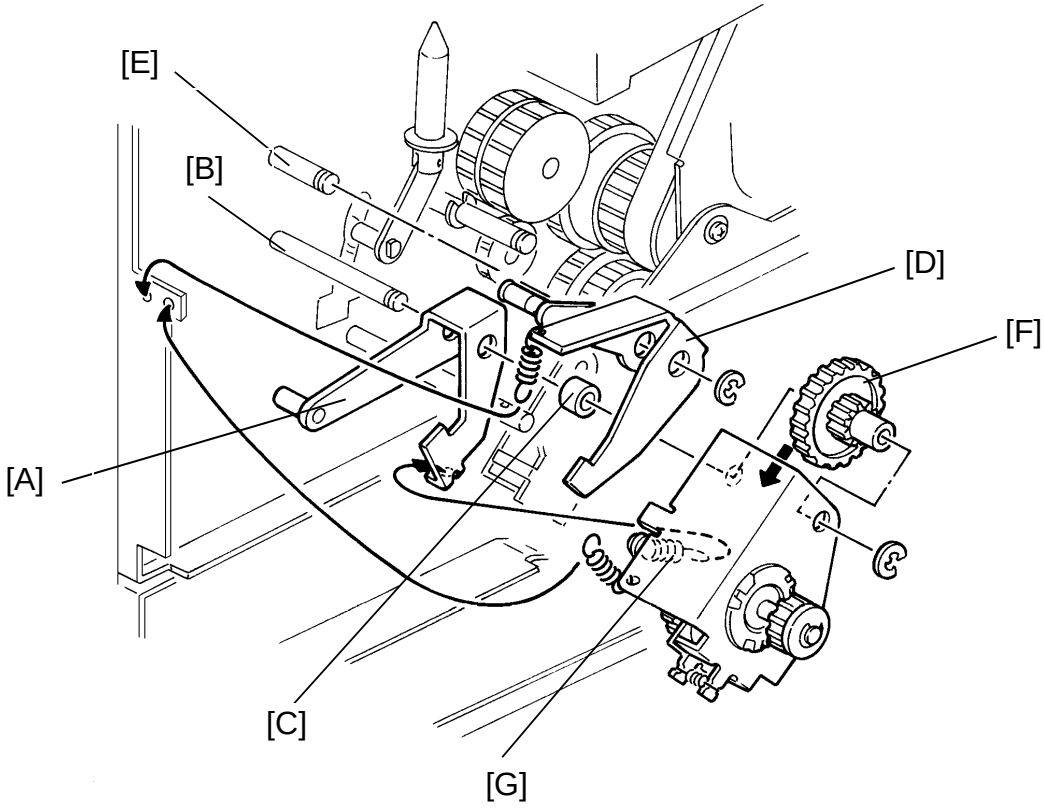


1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the main board (5 locking supports and all connectors).
4. Remove the solenoid bracket [A] (1 screw).
5. Replace the solenoid [B] (1 screw). Press down on the stopper lever [C] while securing the solenoid bracket.

5.7 PAPER LIFT CLUTCH SOLENOID ASSEMBLY REPLACEMENT



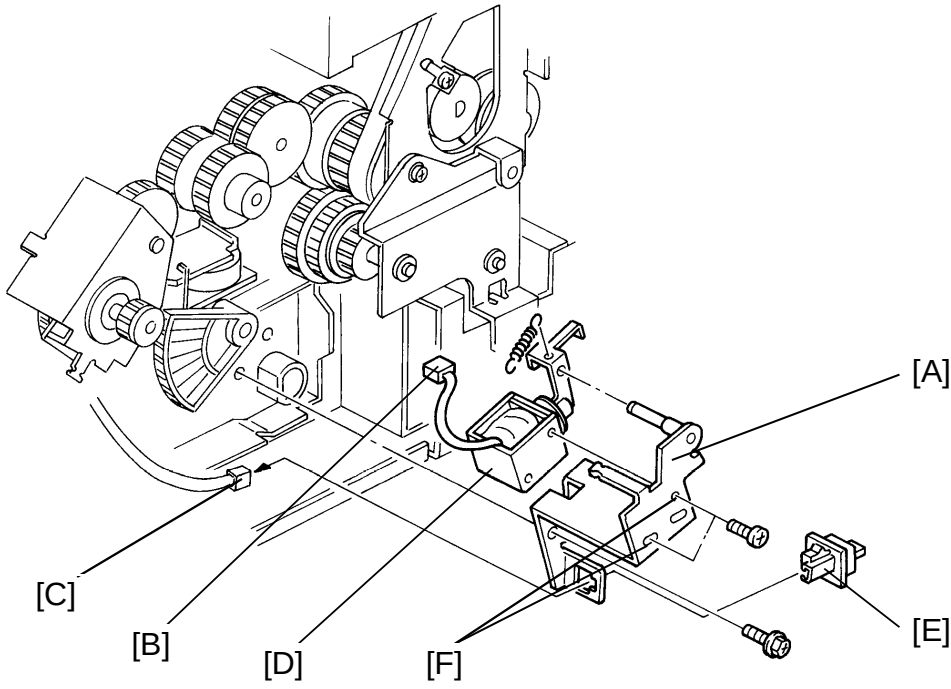
1. Turn off the main switch.
2. Remove the left and rear covers.
3. Remove the main board (5 locking support and all connectors) and main board bracket [A] (1 screw).
4. Remove the sector gear [B] (1 screw).
5. Remove the pick-up roller release solenoid bracket [C]. (See Pick-up Roller Release Solenoid Replacement.)
6. Remove the 1st feed roller spring clutch solenoid bracket [D] (1 screw). (See 1st Feed Roller Spring Clutch Solenoid Replacement.)
7. Remove the 1st feed roller spring clutch [E] (1 E-ring).
8. Remove the paper lift assembly [F] together with the manual feed table detection lever [G] (3 E-rings and two springs).
9. Remove the spring [H] from the actuator lever [I].
10. Replace the paper lift clutch solenoid assembly [J] (spring, collar, and gear).



- To install -

1. Install the actuator lever [A] on the stud pin [B].
2. Set the collar [C] on the stud pin [B].
3. Install the manual feed table detection lever [D] on the stud pin [E].
4. Place the gear [F] on the paper lift clutch solenoid assembly and install it on the stud pin [B] as shown.
5. With a pair of plyers, hook the spring [G] to the actuator lever.
6. Set the 2 E-rings and 2 springs.

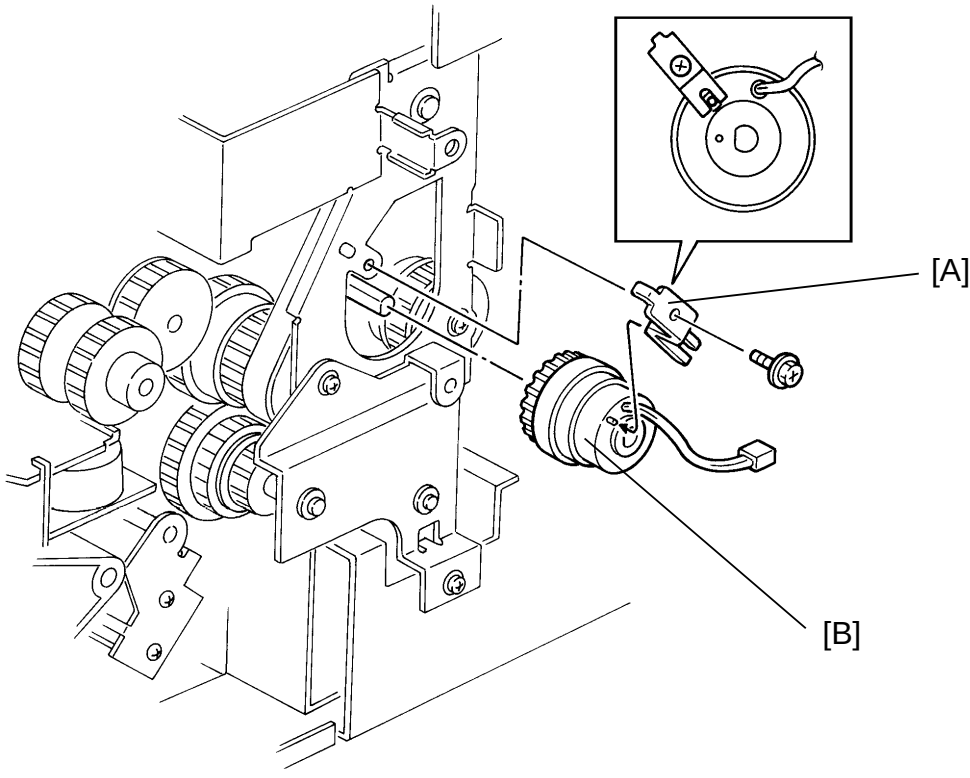
5.8 RELAY ROLLER SPRING CLUTCH SOLENOID AND RIGHT COVER SWITCH REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the solenoid bracket [A] (2 screws).
4. Disconnect the connectors [B and C] of the solenoid and switch.
5. Replace the solenoid [D] (2 screws) or switch [E].

NOTE: When attaching the solenoid to its bracket, be sure to insert the two screws into the correct holes [F].

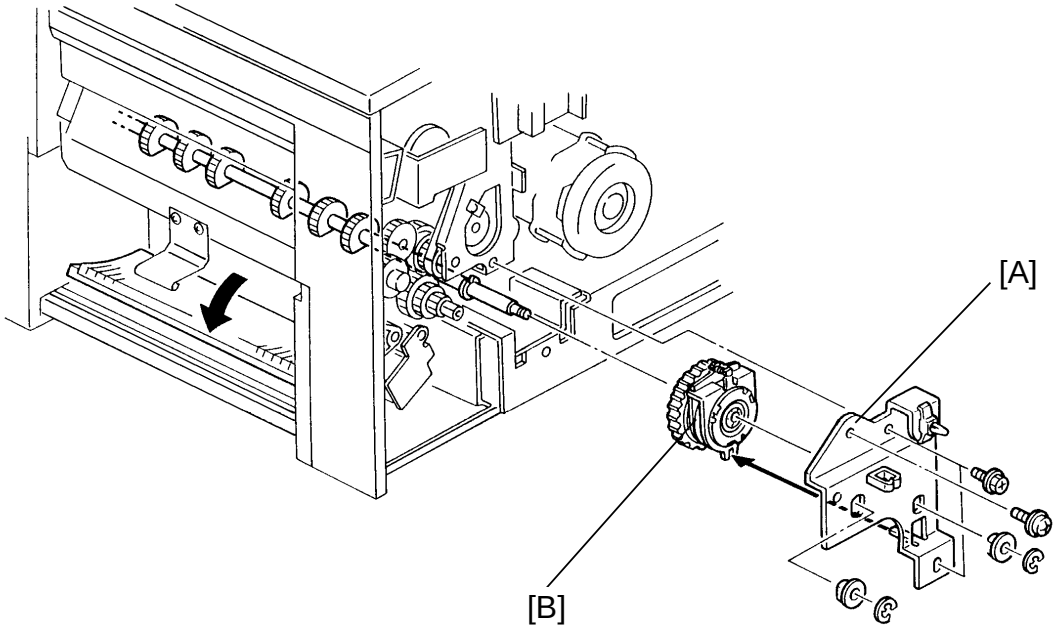
5.9 REGISTRATION CLUTCH REPLACEMENT



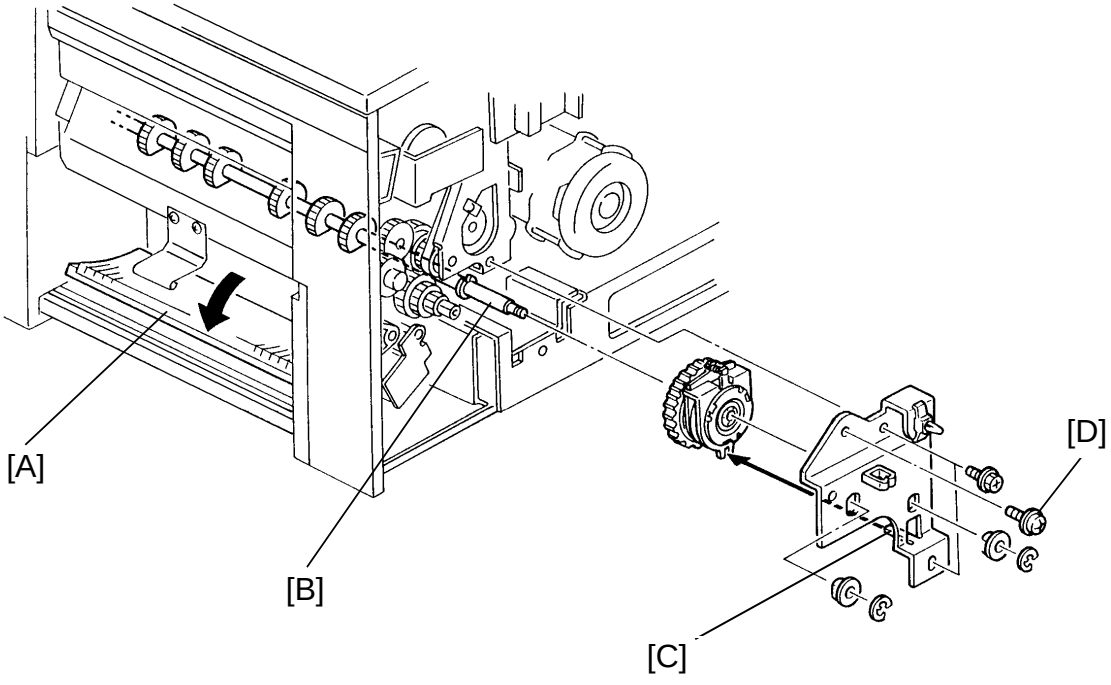
1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the main board (5 locking supports and all connectors).
4. Remove the stopper bracket [A] (1 screw).
5. Replace the registration clutch [B].

NOTE: When reinstalling a new registration clutch, make sure that the stopper bracket locks the registration clutch as shown.

5.10 2ND PAPER FEED CLUTCH SOLENOID REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the main board (5 locking supports and all connectors).
4. Remove the small frame [A] (two E-rings, 3 screws, and 2 bushings).
5. Replace the 2nd paper feed clutch solenoid [B].



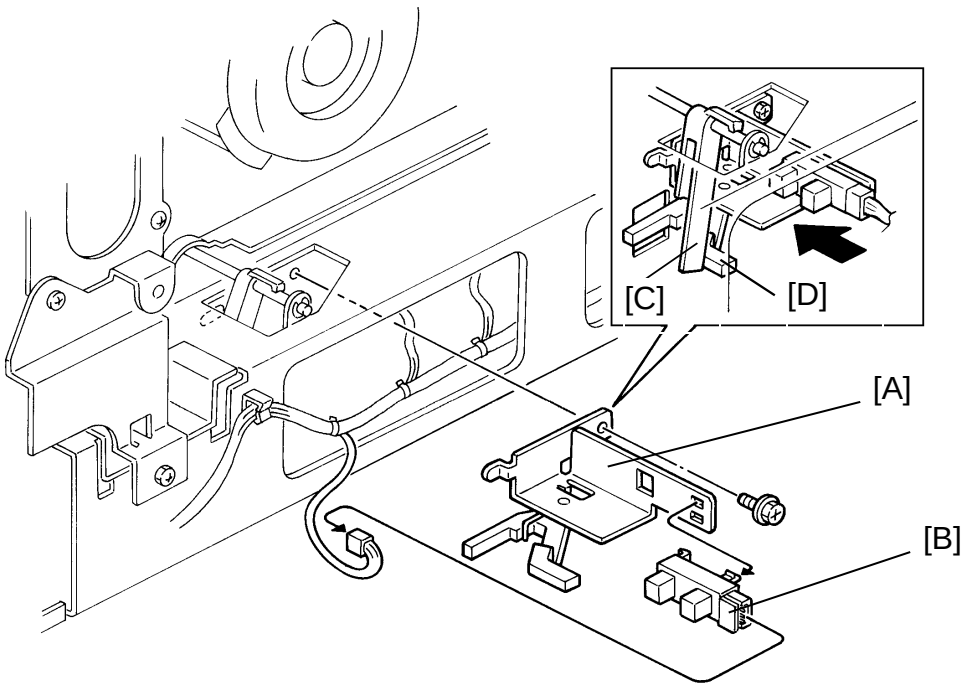
- To install -

1. Set the solenoid on the shaft.
2. Open the right cover [A] and the front cover.
3. Rotate the shaft [B] so that the 2nd feed roller faces up as shown.
4. Install the small frame.

NOTE: a) Make sure that the stopper [C] on the small frame fits into the slot on the solenoid as shown.

b) Screw [D] has a washer.

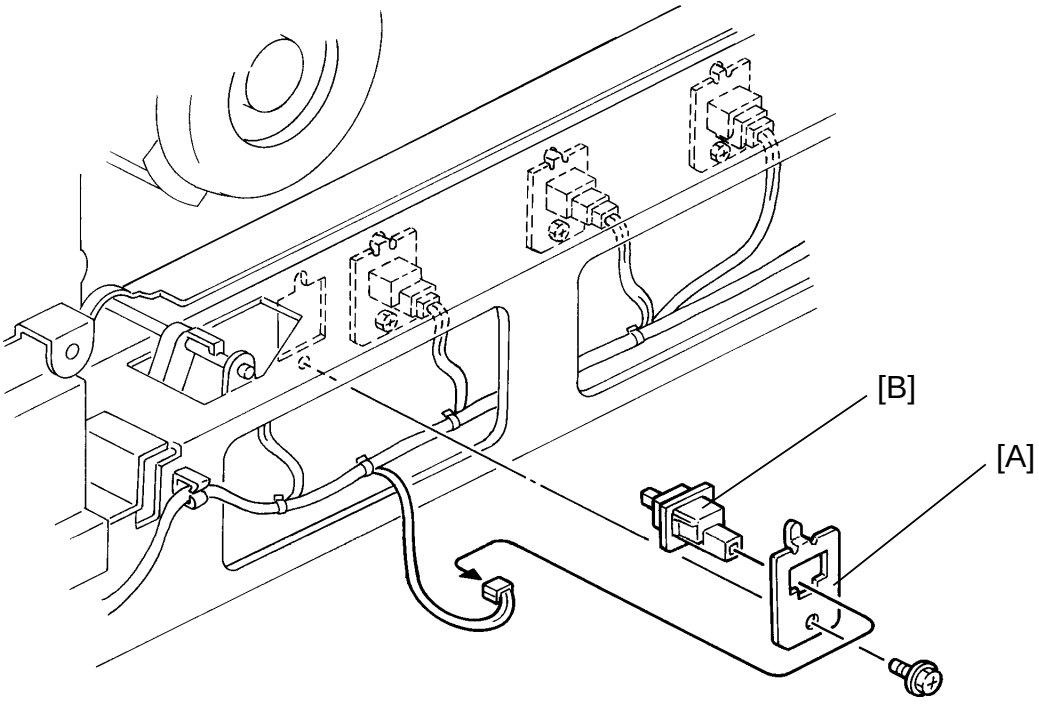
5.11 2ND PAPER END SENSOR REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the sensor bracket [A] (1 screw).
4. Replace the sensor [B] (1 connector).

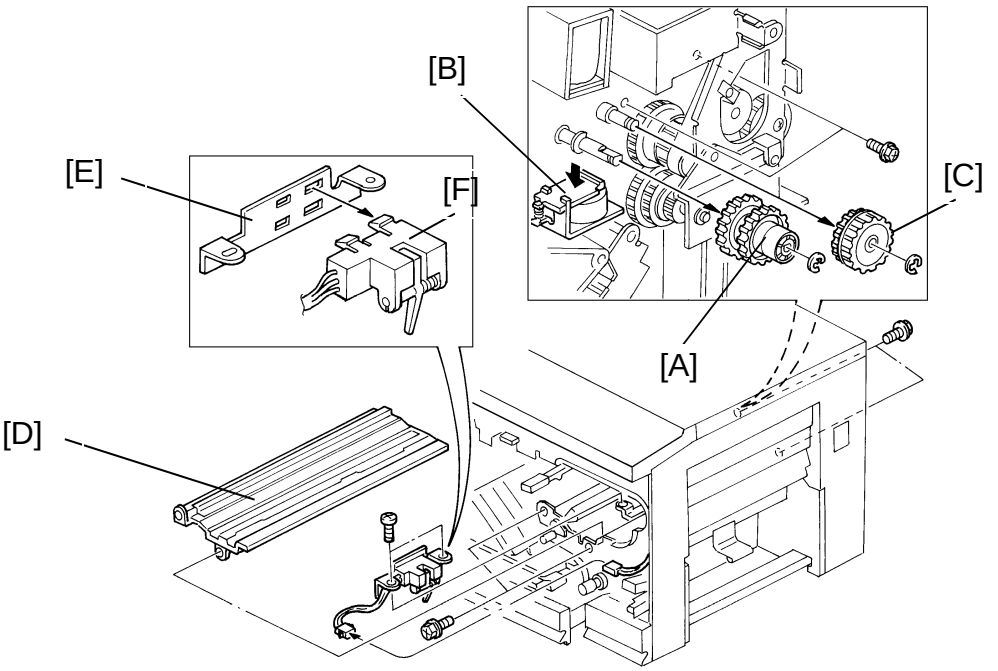
NOTE: When reinstalling the sensor bracket, make sure that the paper end actuator [C] and paper end feeler release lever [D] are properly positioned as shown. If not, the feeler may be damaged when the paper tray is inserted.

5.12 2ND PAPER SIZE SWITCH REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the switch bracket [A] (1 screw).
4. Replace the switch [B] (1 connector).

5.13 REGISTRATION SENSOR AND ROLLER REPLACEMENT

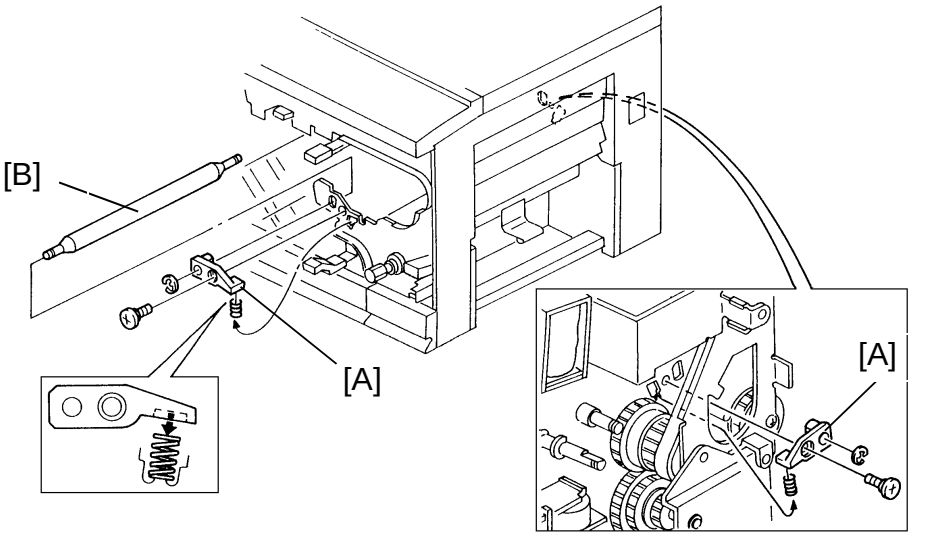


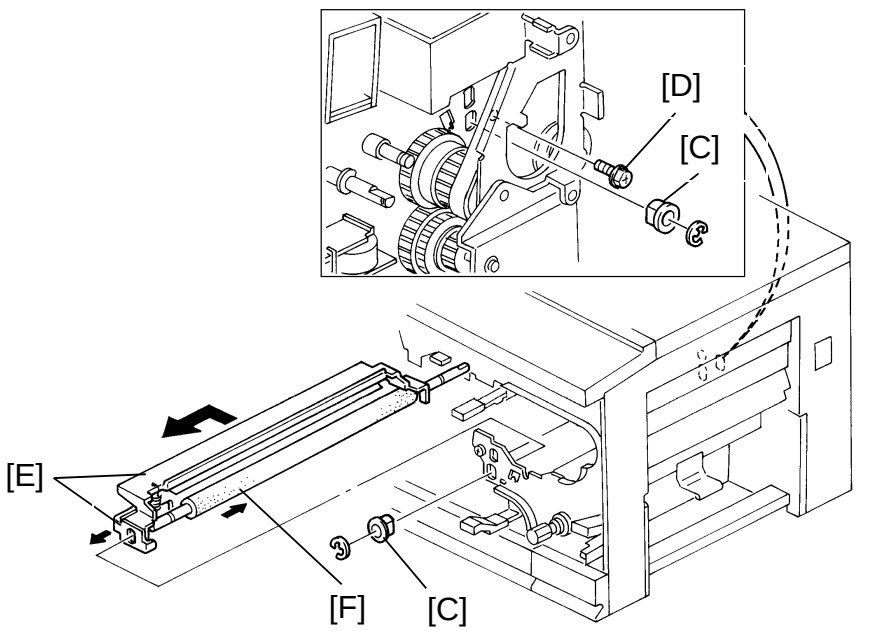
1. Turn off the main switch.
2. Remove the following parts:
   - Front cover (See Exterior Cover Removal.)
   - Development unit
   - Right inner cover (See Interior Cover Removal.)
   - Cleaning unit (See Cleaning Unit Removal.)
   - Drum unit (See Drum Unit Removal.)
   - Rear cover (See Exterior Cover Removal.)
   - Main board
   - PTL board (See PTL Board Replacement)
3. Remove the 1st feed clutch [A] while pressing down on the stopper [B] lever of the solenoid (1 E-ring).
4. Remove the idle gear [C] (1 E-ring).
5. Remove the development lower guide plate [D] (2 screws each at front and rear frames).

- Sensor -

6. Remove the sensor bracket [E] (2 screws).
7. Replace the sensor [F] (1 connector).

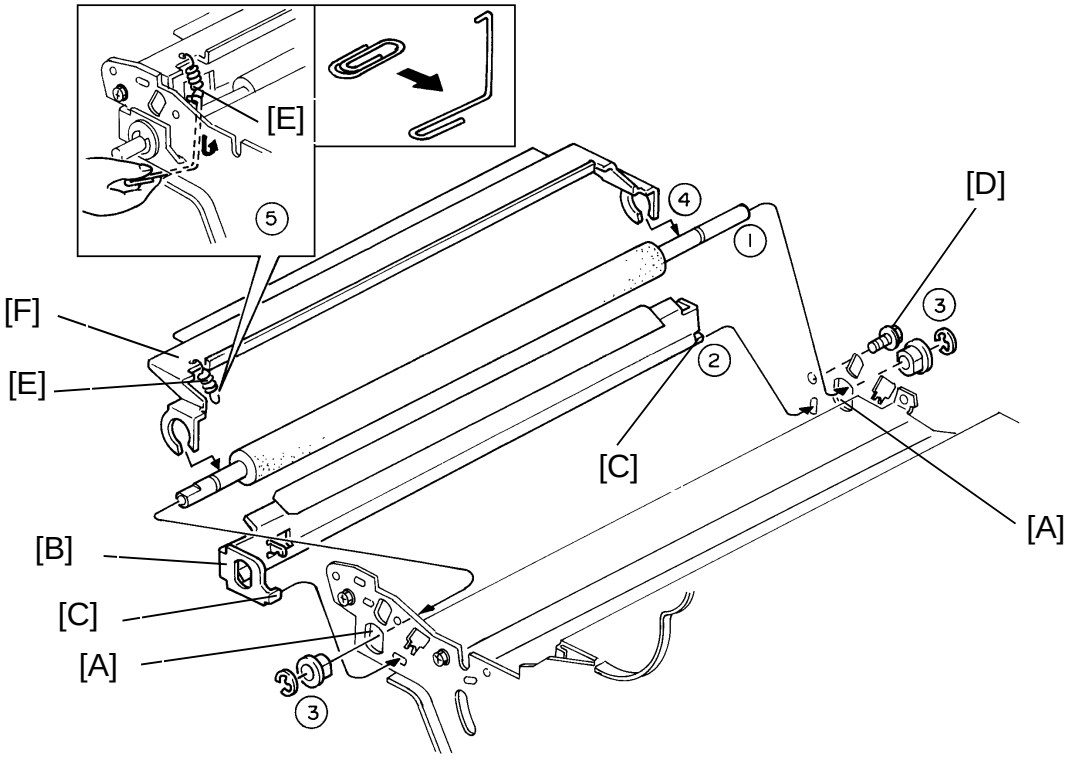
- Registration Rollers -





8. Remove the front and rear bushings [A] (1 screw, pressure spring, and E-ring each) of the upper registration roller.
9. Replace the upper registration roller [B].
10. Remove the 2 bushings [C] (1 E-ring each).
11. Remove the screw [D] securing the upper and lower guide plates [E].
12. Remove the lower registration roller [F] together with the upper and lower guide plates; then, replace the lower registration roller.

- To install (Lower Registration Roller) -



1. Set the ends of the lower registration roller shaft into the front and rear bushing holes [A].
2. Install the lower guide plate [B] with the front and rear hooks [C] in the holes.
3. Insert the bushings, set the E-rings and tighten the screw [D] securing the lower guide plate.
4. Install the spring [E] on the upper guide plate and set the upper guide plate [F].
5. Hook the spring [E] to the lower guide plate using a paper clip as shown.

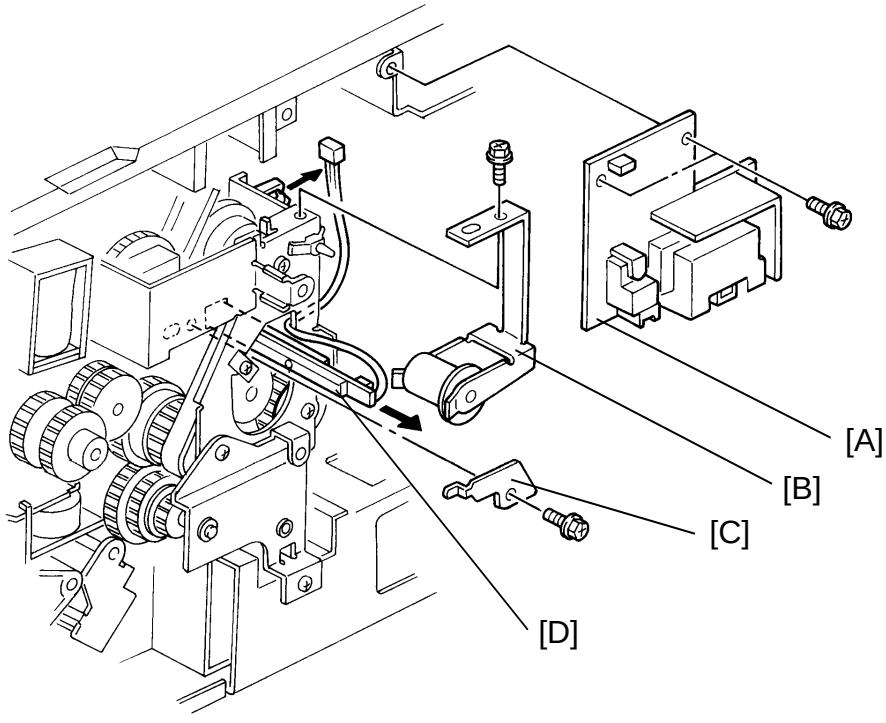
NOTE: Make sure of the following when installing the upper registration roller:

a) The front and rear bushings are different. Make sure that they are in the correct position.

b) The pressure springs are positioned correctly in the bushings.

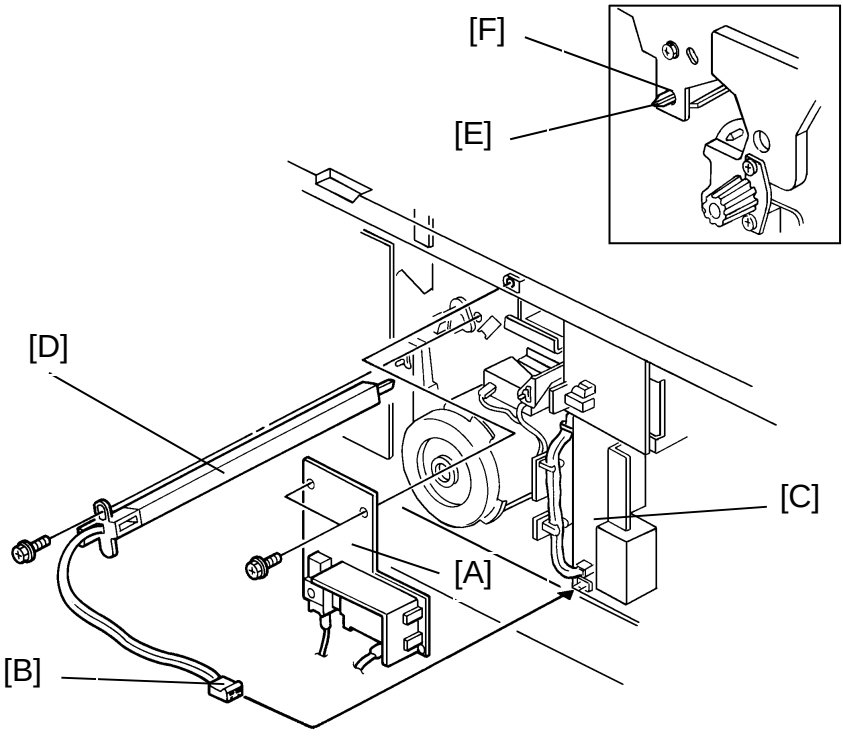
6. AROUND DRUM

6.1 PTL BOARD REPLACEMENT



1. Turn off the main switch.
2. Remove the rear cover.
3. Remove the main board (5 locking supports and all connectors).
4. Remove the TC/SC power pack [A] (2 locking supports and screws).
5. Remove the timing belt tightener [B] (1 screw).
6. Remove the PTL board stopper [C] (1 screw).
7. Replace the PTL board [D].

6.2 QUENCHING LAMP REPLACEMENT/CLEANING



1. Open the front cover and lower the transport unit.
2. Remove the following parts:

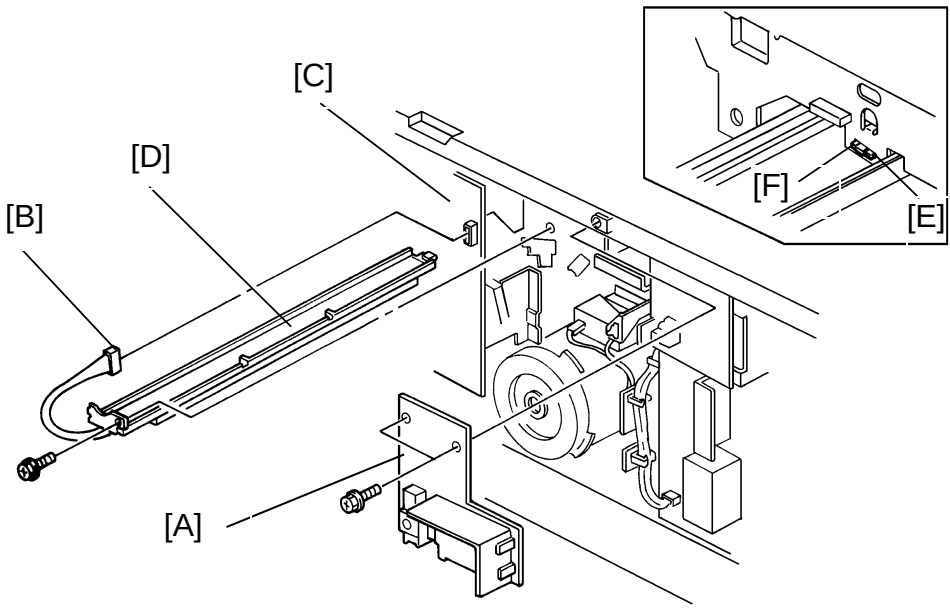
   - Development unit
   - Cleaning unit
   - Charge corona unit
   - Drum unit
   - Rear cover

3. Remove the TC/SC power pack [A] (2 screws, locking supports, and connectors).
4. Disconnect the connector [B] (CN415) from the ac drive board [C].
5. Remove the quenching lamp [D] (1 screw).

NOTE: a) Do not use alcohol to clean the QL. This damages the resin in the LED cover.

b) When reinstalling the quenching lamp, make sure that the positioning pin [E] on the lamp fits through the cutout [F] in the front side plate as shown.

6.3 ERASE LAMP REPLACEMENT

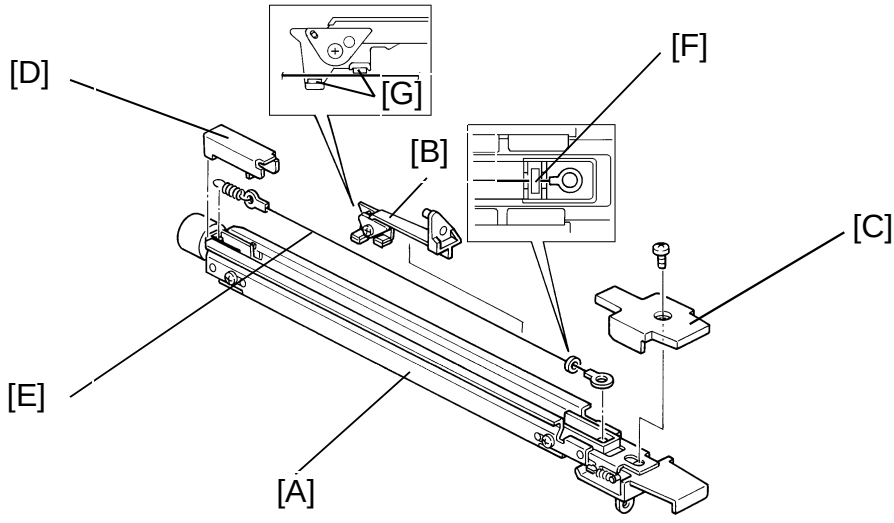


1. Open the front cover and lower the transport unit.
2. Remove the following parts:
   - Development unit
   - Cleaning unit
   - Charge corona unit
   - Drum unit
   - Rear cover
3. Remove the TC/SC power pack [A] (2 screws, locking supports, and connectors).
4. Disconnect the connector [B] (CN109) from the main board [C].
5. Remove the erase lamp [D] (1 screw).

NOTE: a) Do not use alcohol to clean the erase lamp. This damages the resin surface of he LED cover.

b) When reinstalling the erase lamp, make sure that the positioning pin [E] on the lamp fits through the cutout [F] in the front side plate as shown.

6.4 CHARGE CORONA WIRE REPLACEMENT



1. Remove the charge corona unit [A] together with the wire cleaner [B] (1 screw).
2. Remove the wire cleaner from the charge corona unit.
3. Remove the front end block cover [C] (1 screw) and the rear end block cover [D].
4. Unhook the spring from the corona wire [E] and replace the wire.

NOTE: a) Make sure that the damper ring [F] is properly positioned as shown.

b) Do not handle a new corona wire with bare hands. Oil on the wire may cause uneven charge on the drum.

c) Do not rub the corona wires with rough material (sandpaper, etc.) as this will damage the corona wires.

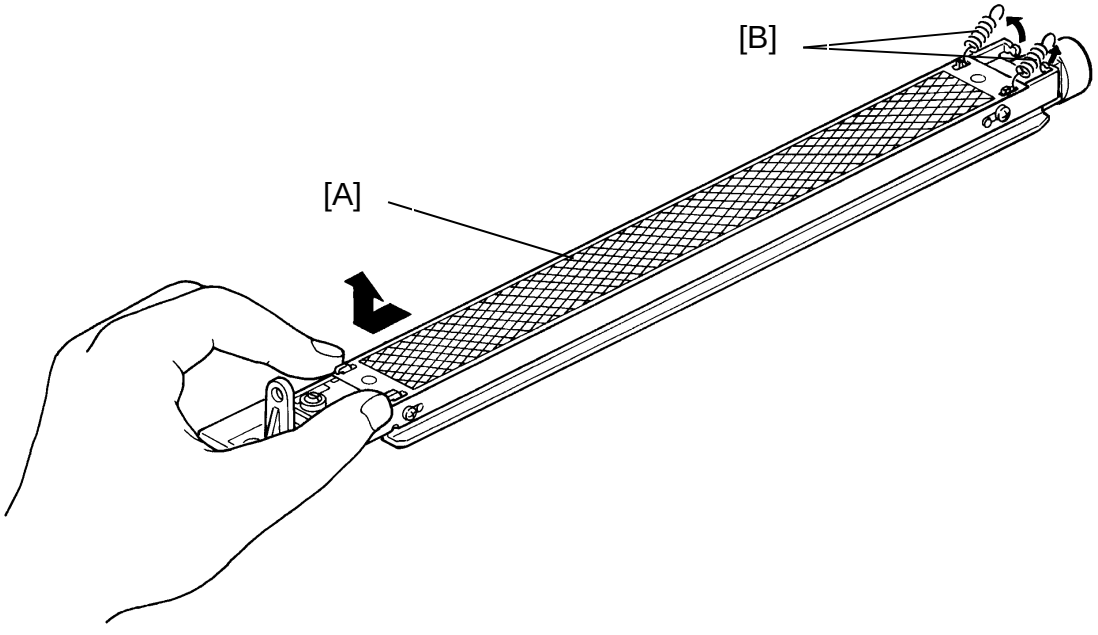
d) When removing the end block covers, be careful not to break off the side hooks.

e) Do not use any solvents to clean the wires as this will cause uneven charge on the drum.

f) Do not damage the grid when replacing the charge wire.

g) When installing the charge corona unit, make sure that the wire is positioned between the cleaner pads [G].

6.5 CHARGE CORONA GRID REPLACEMENT

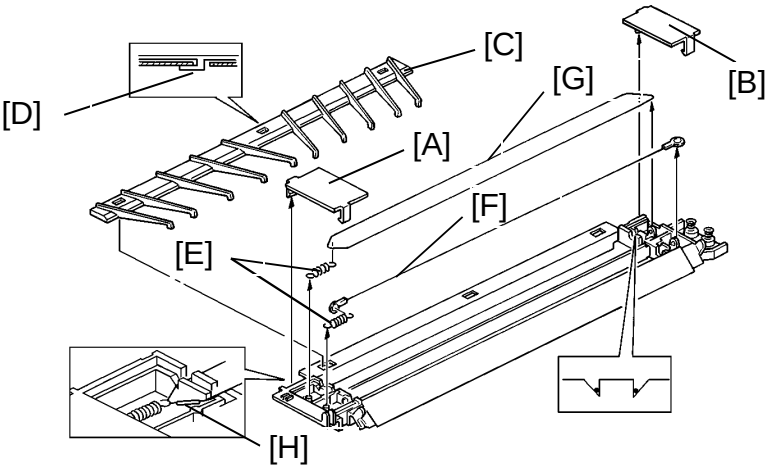


1. Remove the charge corona unit.
2. Remove the grid plate [A] (2 springs [B]).

NOTE: a) Oils and chemicals from your hands will deteriorate the grid.

b) Do not bend the grid plate. This can result in an uneven charge.

6.6 TRANSFER/SEPARATION CORONA WIRE REPLACEMENT



1. Remove the transfer/separation (TC/SC) corona unit.
2. Remove the following parts:
   - TC/SC unit front end block cover [A]
   - TC/SC unit rear end block cover [B]
   - TC/SC unit paper guide [C].

NOTE: When reinstalling the TC/SC unit paper guide, verify that all three tabs [D] are properly latched in place.

3. Unhook the springs [E] from the wires.
4. Replace the transfer corona wire [F] and the separation corona wire [G].

NOTE: a) When installing the separation corona wire, make sure that the wire junction [H] is positioned inside the front endblock.

b) The transfer and separation corona wires must be in the grooves of the front and rear endblocks as shown.

c) Do not handle new corona wire with bare hands. Oil on the wire may cause an uneven charge on the drum.

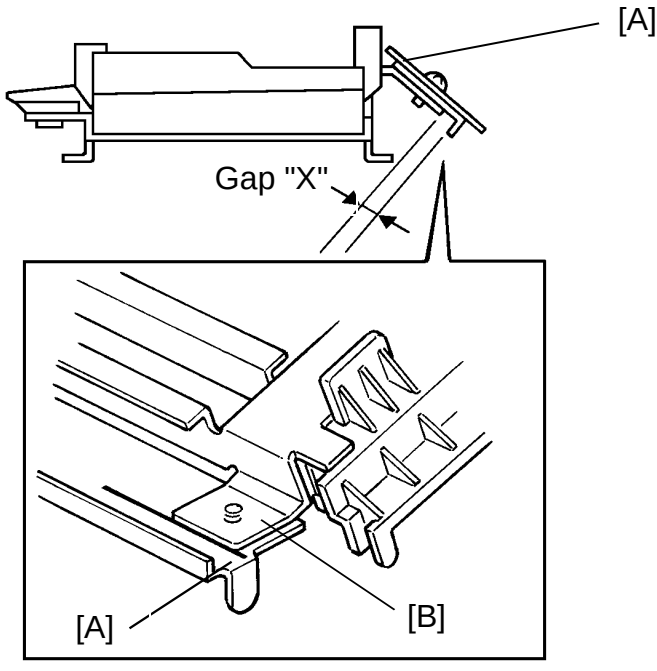
d) Rubbing the corona wires with a rough material (sandpaper, etc.) will damage the corona wires.

e) When removing the end block covers, be careful not to break off the side hooks.

f) Do not use any solvents to clean the wires as this will cause uneven charge on the drum.

g) The transfer entrance guide is positioned with a special tool at the factory.

6.7 ENTRANCE GUIDE PLATE HEIGHT ADJUSTMENT

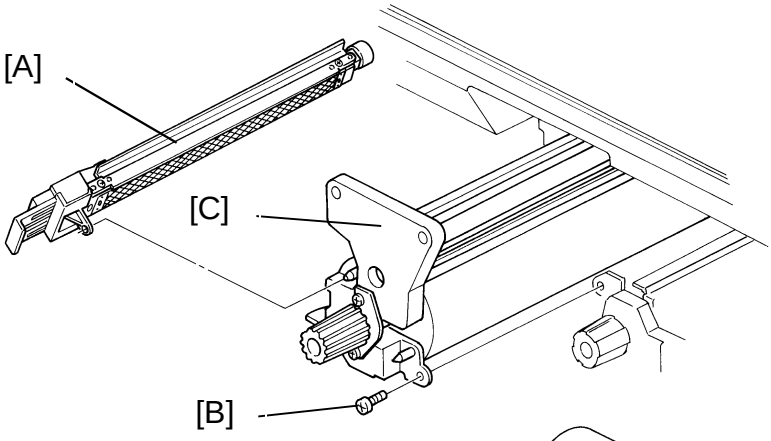


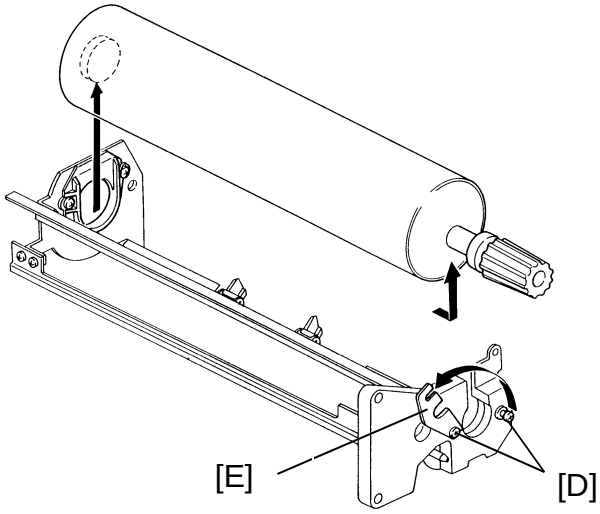
NOTE: Do not loosen or remove the entrance guide plate [A] except to replace it. The entrance guide plate height (gap between the leading edge of the entrance guide plate mylar and drum) is adjusted at the factory with special equipment.
Before removing the entrance guide plate, mark its original position as shown. Position the new entrance guide plate so that the edge of the plate is aligned with the mark.
If the original position of the entrance guide plate was not marked before the plate was loosened or removed, adjust its position as follows:

ADJUSTMENT STANDARD: GAP "X" Front 2.65 ± 0.1 mm
Rear 3.25 ± 0.1 mm

1. Set the gap "X" between the edge of the bracket [B] and the entrance guide plate adjustment standard using the thickness gauge as shown in the illustration. Then, tighten both the front and rear screws.
2. Make sure that the leading edge of the entrance guide plate mylar does not contact the drum after the TC/SC corona unit is installed.

6.8 DRUM REPLACEMENT

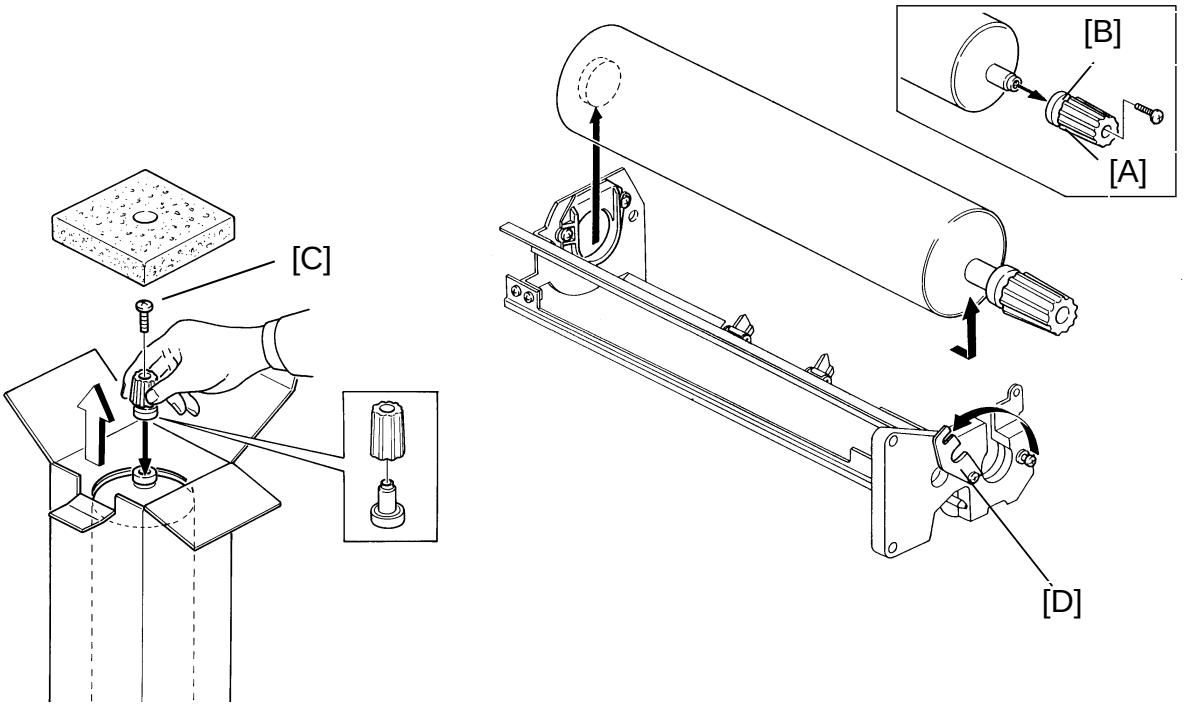




1. Lower the transport unit.
2. Remove the following units:
   - Development unit
   - Cleaning unit
   - Charge corona unit [A] and wire cleaner
3. Remove the fixing screw [B] securing the drum stay and pull out the drum unit [C] gently along the rail.
4. Place the drum unit on a sheet of paper. Loosen the two screws [D] securing the bearing holder and rotate the holder as shown.
5. Remove the drum by holding the drum unit rail and pulling out and up on the drum knob.

NOTE: a) When removing the drum, take care not to strike it against any objects.

b) Be careful not to bend the bearing holder [E].



6. Remove the drum knob [A] and the bearing [B] and install them with the screw [C] on the new OPC drum. Do not remove the protective sheet from the new drum.

7. Set the OPC drum in the unit and put the bearing holder [D] back in place. Tighten the screws.

NOTE: a) When setting the drum in the unit, be careful not to strike it against the rail.

b) Do not bend the bearing holder. Make sure the bearing holder is in contact with the bearing [B], as they are both used to ground the unit. If they are not in contact, solid black copies may occur.

c) Do not touch the drum surface.

8. Set the drum unit in the machine and remove the drum protective sheet.

9. Reinstall the other units around the drum unit.

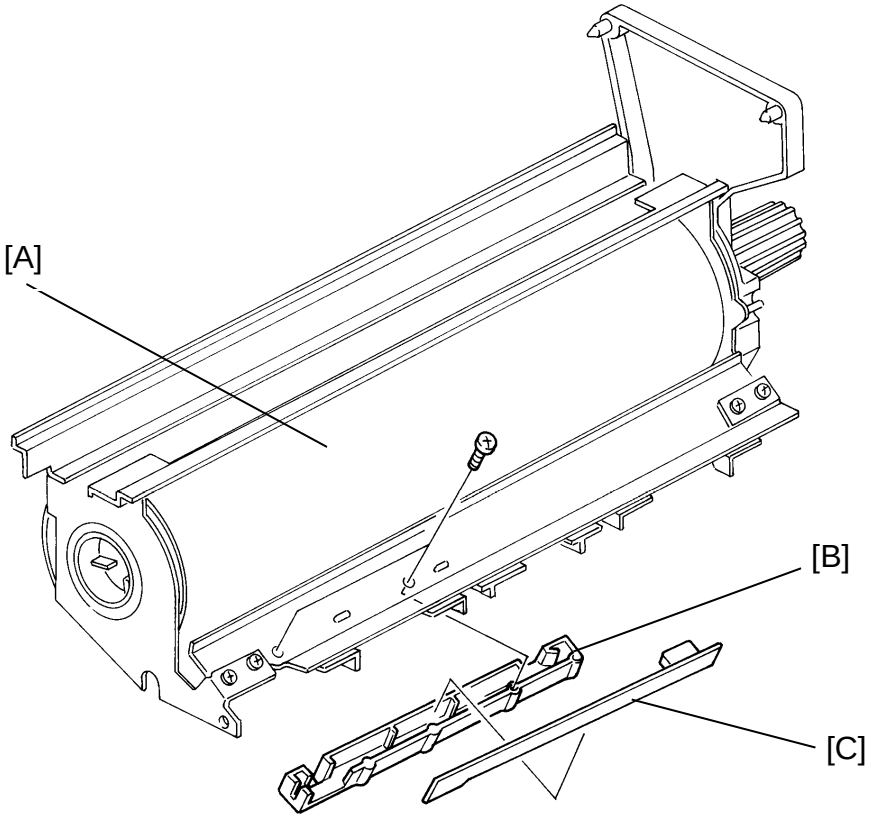
10. To access the SP mode, press in sequence the Mode Clear key, Clear/Stop key and the Enter key.

11. Reset the drum counter using SP mode #66.

NOTE: The drum counter must be reset by SP Mode #66 whenever an OPC drum is replaced.

12. Perform the ID sensor (Vsg) adjustment (SP mode #54).

6.9 ID SENSOR REPLACEMENT

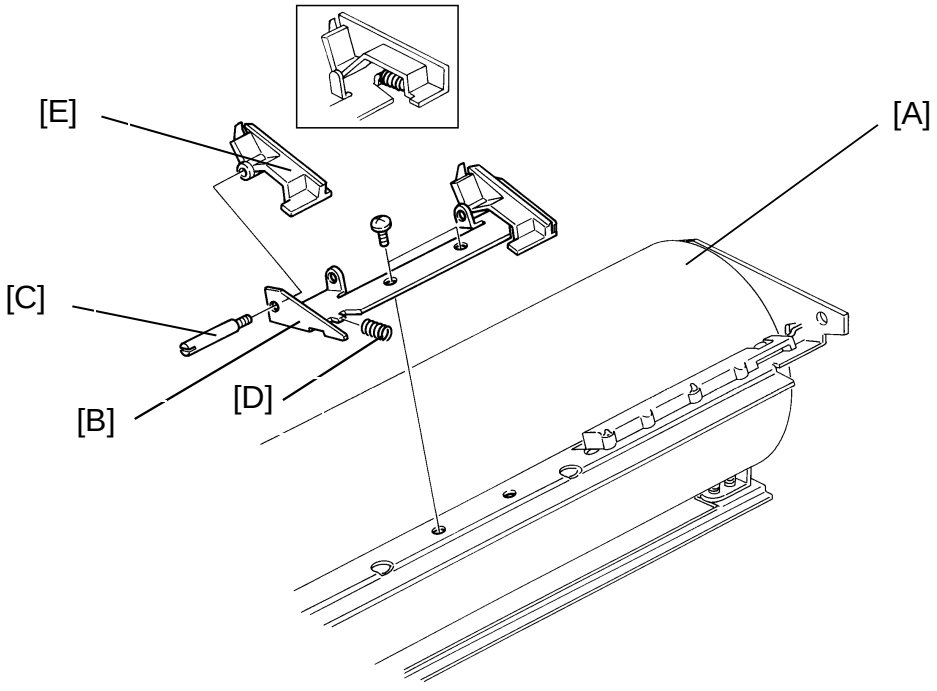


1. Remove the drum unit, then remove the drum [A] from the unit. (See Drum Replacement.)

NOTE: Cover the drum with the protective sheet to prevent the drum from being exposed to light.

2. Remove the ID sensor holder [B] (2 screws).
3. Replace the ID sensor board [C].
4. Perform the ID sensor (Vsg) adjustment (SP mode #54).

6.10 PICK-OFF PAWL REPLACEMENT



NOTE: Cover the drum with the protective sheet after removing it from the drum unit. This prevents the drum from being exposed to light.

1. Remove the drum unit, then separate the drum [A] from the unit. (See the Drum Replacement section.)
2. Remove the pick-off pawl bracket [B] (2 screws).
3. Remove the screws [C] and the springs [D], then replace the pick-off pawls [E].

NOTE: When replacing the new pick-off pawls, make sure that the springs are positioned correctly as shown in the illustration.

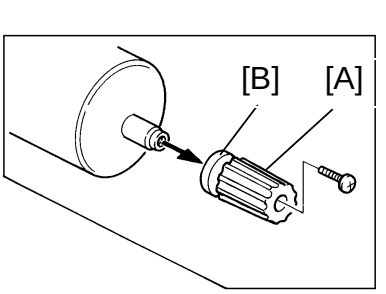
6.11 CORONA CURRENT ADJUSTMENT

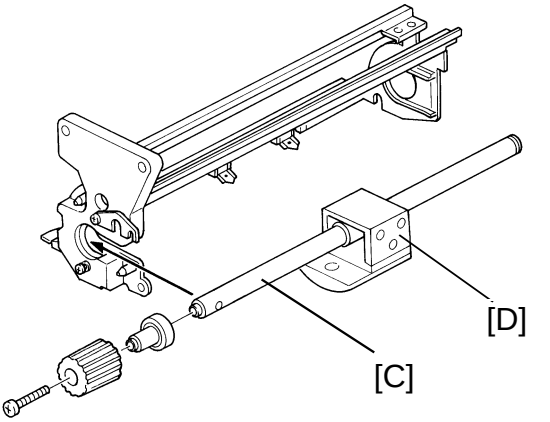
NOTE: The corona current varies with environmental conditions such as humidity and atmospheric pressure. The corona current is adjusted at the factory and is suitable under a wide range of environmental conditions. Corona current adjustment is necessary whenever the power packs are replaced; adjustment may also be necessary to correct problems with paper separation, toner transfer, or image density.

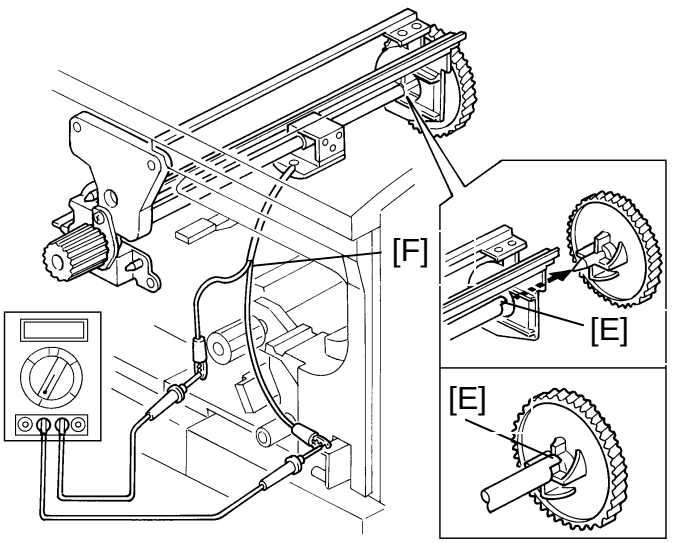
CAUTION: – Make sure that SP mode #9 is cleared before you change the range on the digital multimeter. If not, the multimeter may be damaged.
– High voltage is applied to the corona wires. Be careful.

- Preparation -

1. Turn off the main switch and remove the following parts:
   - Development Unit
   - Cleaning Unit
   - Charge Corona Unit
   - TC/SC Corona Unit
   - Drum Unit
2. Clean or replace each corona wire and clean the corona units with water or alcohol.
3. Remove the rear cover (4 screws).
4. Disconnect CN123 on the main board.





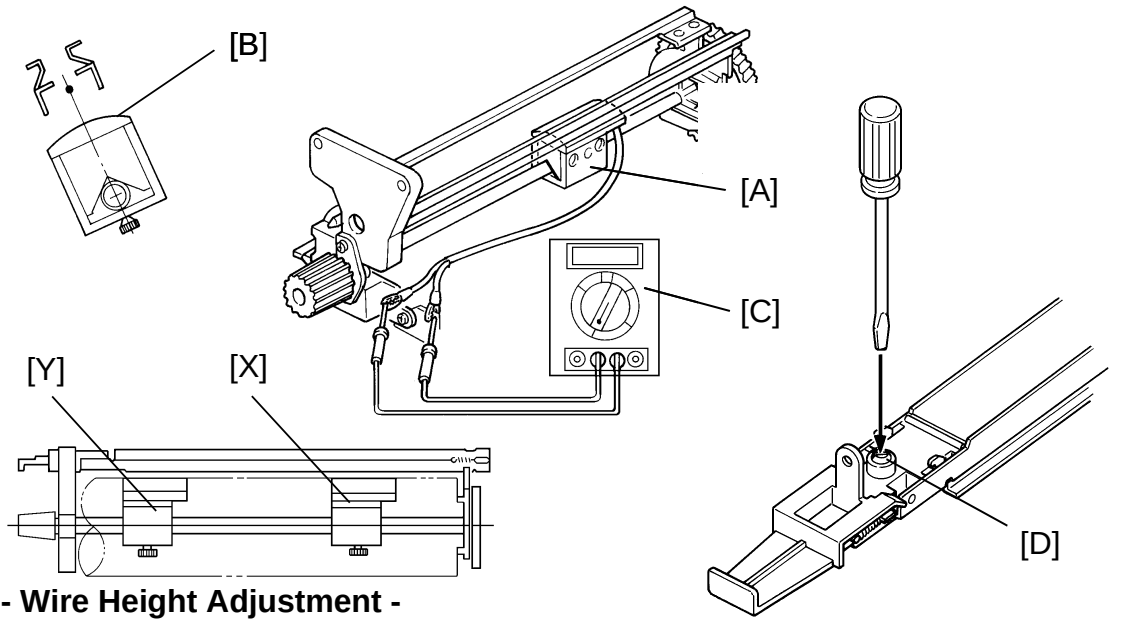


NOTE: Do steps 4 – 8 before adjusting the transfer corona current, separation corona current or charge wire height:

5. Remove the drum from the drum unit. Cover the drum with a shielding sleeve. (See Drum Replacement.)
6. Remove the drum knob [A] and the bearing [B] from the drum, then install them on the drum shaft [C] (special tool: P/N #A0069105).
7. Set the drum shaft and drum shoe [D] on the drum unit as shown.

   NOTE: Be careful not to injure your hand on the edge of the pick-off pawls.
8. Reinstall the drum unit with the shaft rear end [E] positioned as shown in the illustration. Pass the harness [F] down into the development unit.
9. Connect the negative harness lead to the copier frame, then connect both multimeter leads as shown to the harness leads.

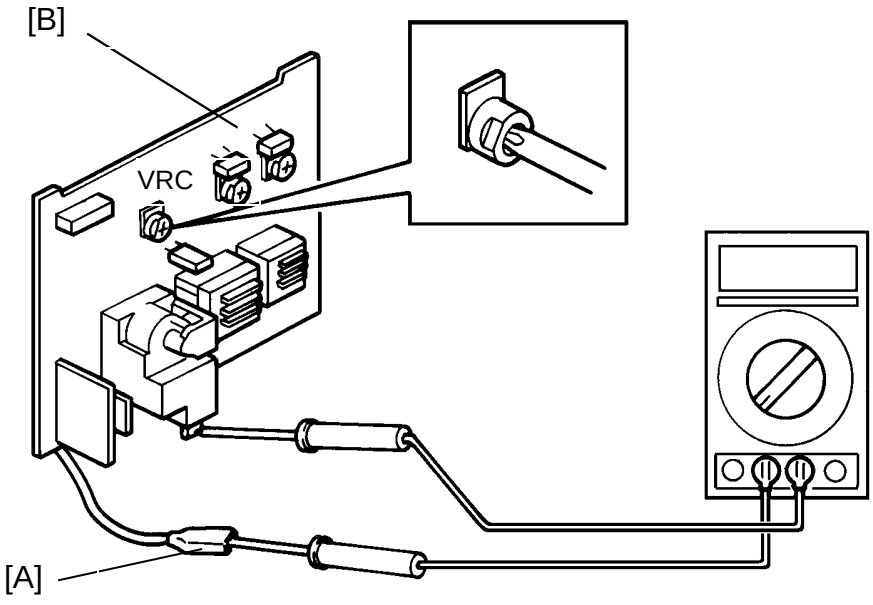
6.11.1 CHARGE CORONA CURRENT ADJUSTMENT (SP Mode #9-2)



- Wire Height Adjustment -

NOTE: If the OS-A3 test chart gray scale shows an uneven image after the front end block of the charge corona unit is replaced, check and adjust the wire height as follows:

1. Set the drum shaft and drum shoe on the drum unit and install the drum unit in the machine. (See Drum Current Adjustment Preparation.)
2. Slide the the drum shoe [A] to the rear limit [X] as shown.
3. Position the drum shoe so that the axis of the current sensing plate [B] is aligned with the charge corona wire as shown.
4. Reinstall the charge corona unit on the drum unit.
5. Select the dc 200 μA range on the digital multimeter [C].
6. Using SP mode #9–2, turn on the main switch, front door safety switch and the charge corona .
7. Note the reading. (Wait at least 30 seconds for the current to stabilize.)
8. Press the Clear/Stop key to turn off the charge corona, then move the drum shoe to the front limit [Y] as shown and repeat steps 3 to 7.
9. Adjust the front corona wire height by turning the adjusting screw [D] if the two readings are different.
10. Repeat steps 2 to 9 until the difference between the front and rear readings is no more than 4%.



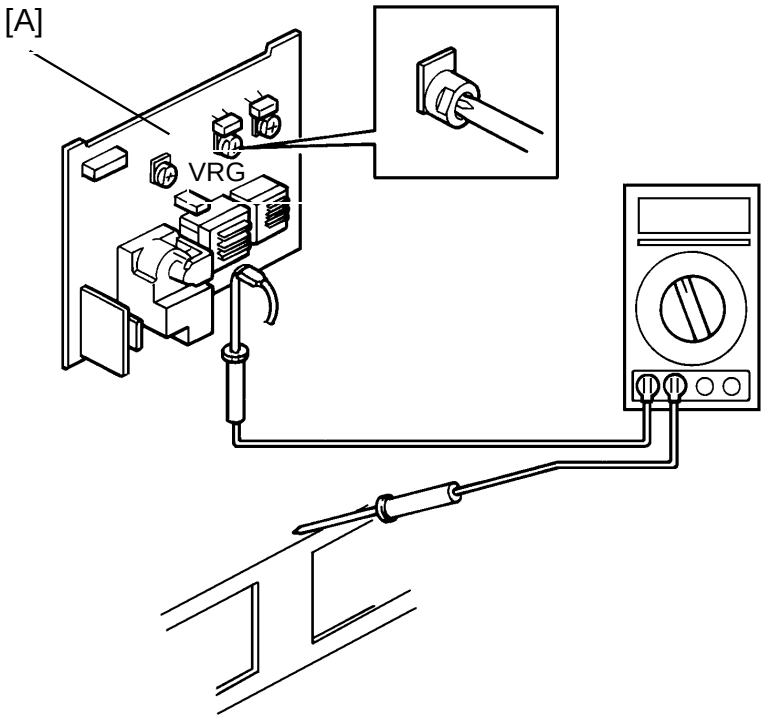
- Charge Corona Current Adjustment -

ADJUSTMENT STANDARD	Adjusting VR	SP Mode No.
DC –400 ± 2 μA	VRC	#9–2

NOTE: Keep the high voltage wire terminal [A] away from the copier frame. Otherwise, electrical leakage may interfere with current measurement.

1. Turn off the main switch.
2. Disconnect the charge corona terminal [A] from the CC/G/B power pack [B].
3. Select the dc 2mA range on the digital multimeter.
4. Connect the multimeter leads as shown, then measure the charge corona current.
5. Turn on the main switch, front door safety switch and the charge corona using SP mode #9–2.
6. Adjust the charge corona current to –400 ± 2 μA by turning VRC on the CC/G/B power pack [B].
7. Press the Clear/Stop key.

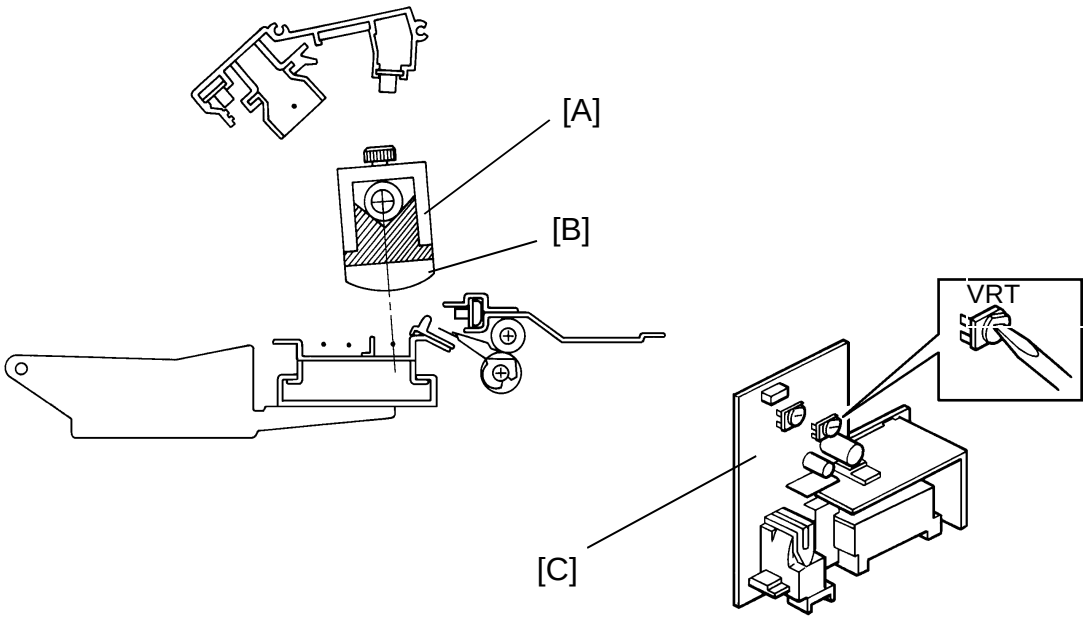
6.11.2 GRID VOLTAGE ADJUSTMENT (SP Mode #9-2)



ADJUSTMENT STANDARD	Adjusting VR	SP Mode No.
DC –920 ± 16 V	VRG	#9–2

1. Set the multimeter range to dc 1500V and connect the multimeter leads as shown.
2. Turn on the main switch, front door safety switch, and grid using SP mode #9-2.
3. Adjust VRG of the CC/G/B power pack to –920 ± 16 V by turning VRG on the CC/G/B power pack [A].
4. Press the Clear/Stop key and turn off the main switch.

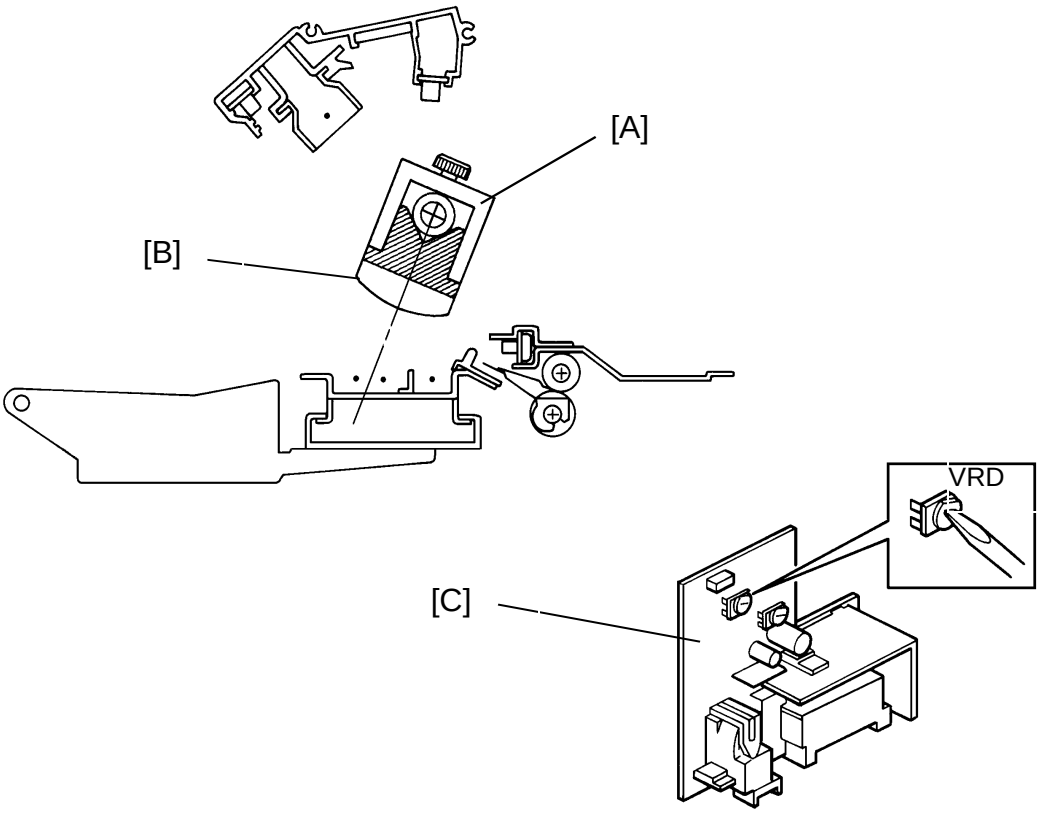
6.11.3 TRANSFER CORONA CURRENT ADJUSTMENT (SP Mode #9-5)



ADJUSTMENT STANDARD	Adjusting VR	SP Mode No.
DC –19.3 ± 0.5 μA	VRT	#9–5

1. Reinstall the TC/SC corona unit and position the drum shoe [A] on the center of the shaft so that the axis of the current sensing plate [B] is aligned with the transfer corona wire as shown.
2. Select the dc 200 μA range on the digital multimeter.
3. Turn on the main switch, front door safety switch, and transfer corona using SP mode #9–5.
4. Adjust the transfer corona current to dc –19.3 ± 0.5 μA using VRT on the TC/SC power pack [C].
5. Press the Clear/Stop key and turn off the main switch.

6.11.4 SEPARATION CORONA CURRENT ADJUSTMENT (SP Mode #9-8)



ADJUSTMENT STANDARD	Adjusting VR	SP Mode No.
AC 41.6 ± 1.3 μA	VRD	#9–8

1. Reinstall the TC/SC corona unit and position the drum shoe [A] on the center of the shaft so that the axis of the current sensing plate [B] is aligned with the separation corona wire as shown.

NOTE: Make sure that the drum shoe does not touch the pick-off pawls.

2 Select the ac 200 μA range on the digital multimeter.

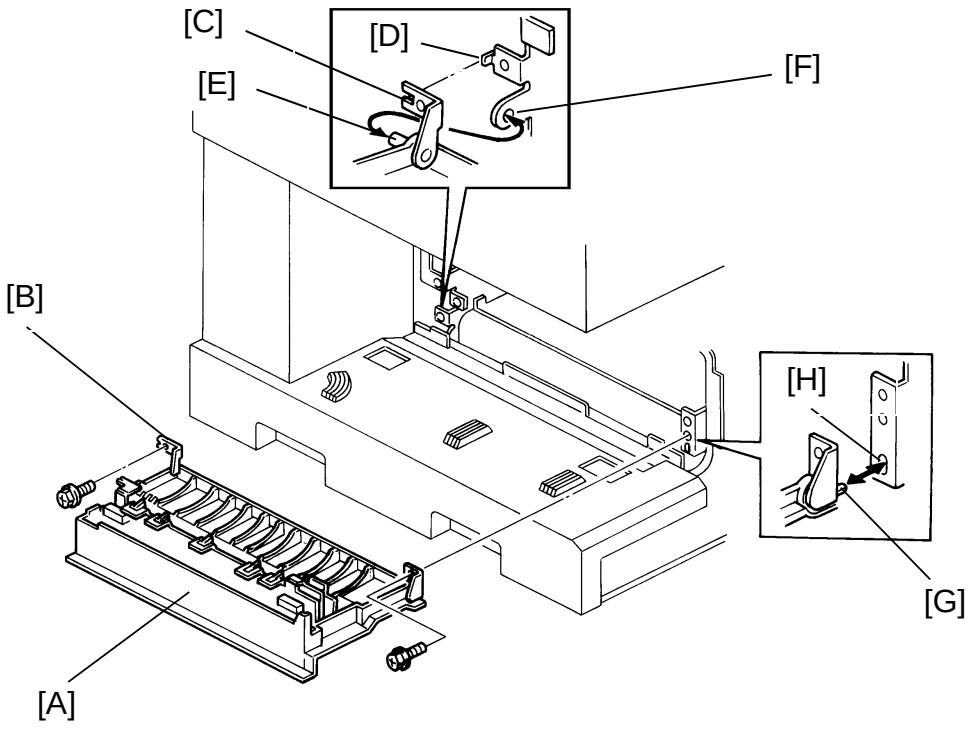
3. Turn on the main switch, the front safety switch, and the separation corona using SP mode #9–8.

4. Adjust the separation corona current to ac 41.6 ± 1.3 μA using VRD on the TC/SC power pack [C].

5. Press the Clear/Stop key and turn off the main switch.

7. FUSING

7.1 EXIT UNIT REMOVAL



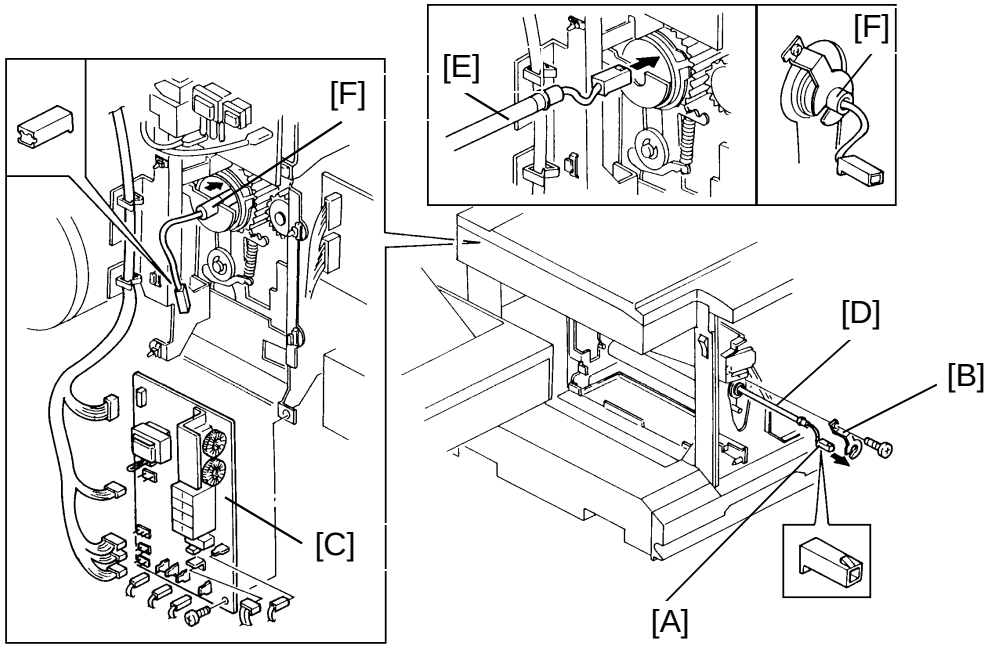
1. Remove the copy receiving tray or slide the sorter in the left side if it is installed.
2. Open the exit unit [A].
3. Remove the exit unit (2 screws and the rear holder [B]).

NOTE: When reinstalling the exit unit, make sure of the following:

a) The slot [C] in the rear holder fits over the projection [D] on the fusing unit rear frame and the holder pin [E] fits through the hole [F] as shown.

b) The projection [G] on the front holder fits through the hole [H] in the fusing unit front frame.

7.2 FUSING LAMP REPLACEMENT



1. Make sure that the main switch is turned off and the power supply cord is unplugged.
2. Open and remove the front cover.
3. Remove the left inner cover. (See Interior Covers Removal.)
4. Disconnect the connector [A] at the front side.
5. Remove the front support bracket [B] (1 screw).
6. Remove the rear cover.
7. Remove the ac drive board [C] (all connectors, 4 locking supports, and 1 screw).
8. Pull the fusing lamp [D] out the front end of the fusing roller.

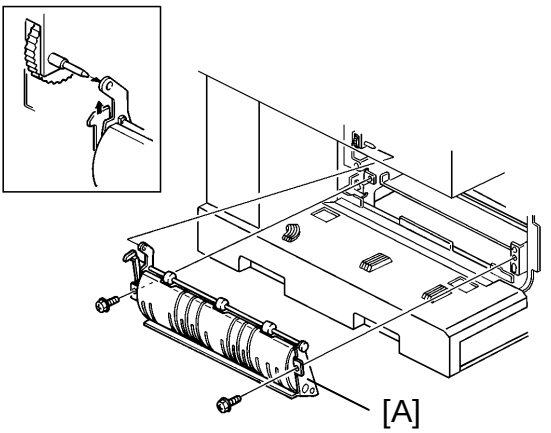
NOTE: a) Do not touch the fusing lamp with bare hands.

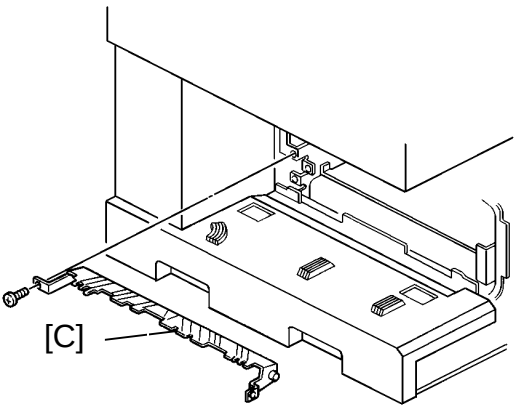
b) Slide the new fusing lamp [E] into the fusing roller through the opening at the rear of the roller. (See the arrow in the illustration.)

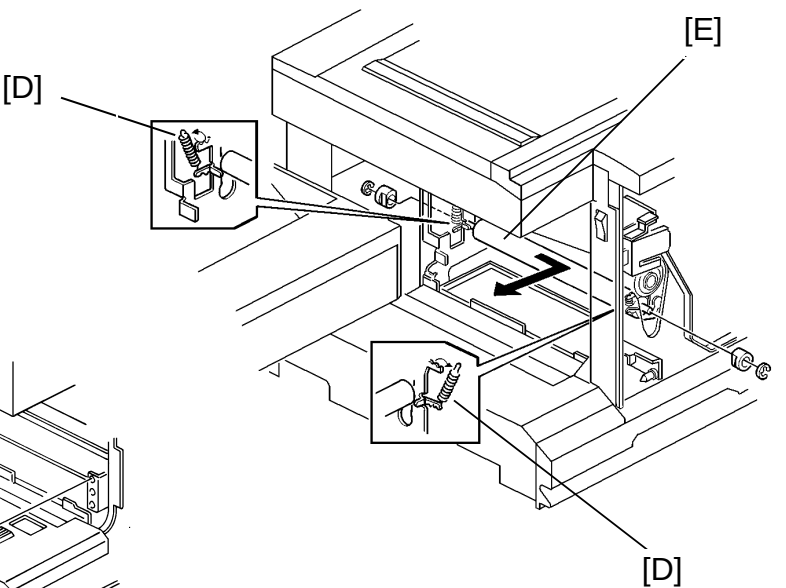
c) The connector housings used at the front and rear sides are different.

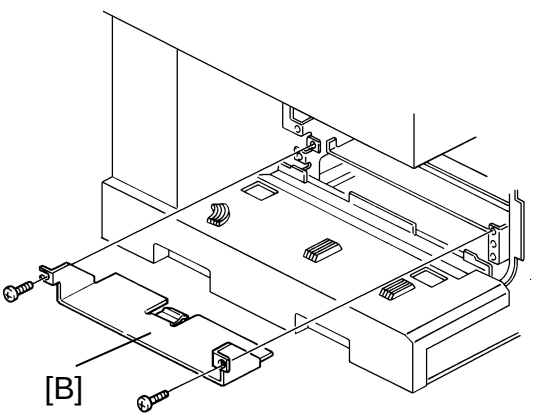
d) Make sure that the fusing lamp insulators [F] are properly set in the holders as shown.

7.3 PRESSURE ROLLER REPLACEMENT

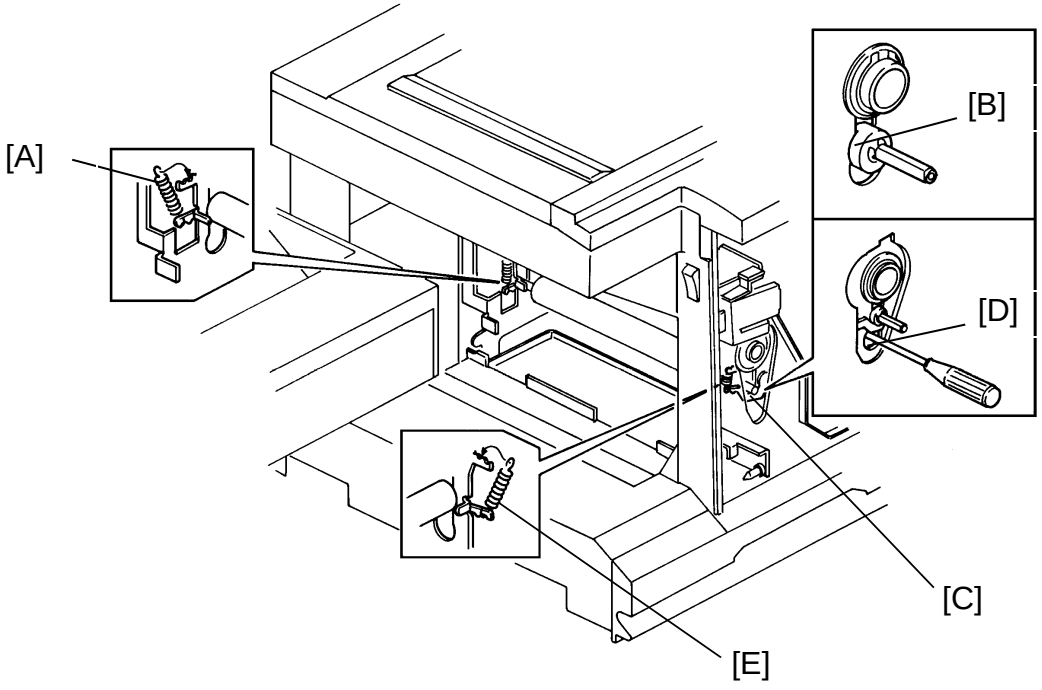








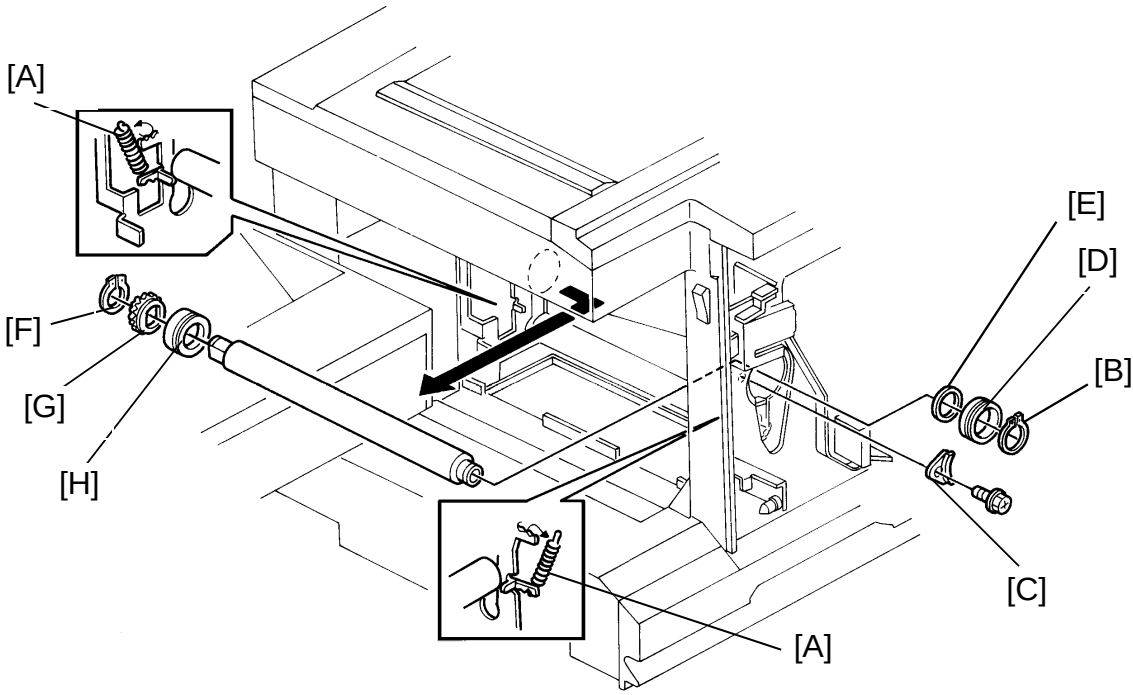
1. Remove the exit unit. (See Exit Unit Removal.)
2. If the duplex tray is installed, remove the turn guide plate [A] (2 screws). If not, remove the fusing bottom plate [B] (2 screws).
3. Remove the exit paper guide [C] (1 screw).
4. Remove the rear cover and the ac drive board. (See Fusing Lamp Replacement.)
5. Remove the front and rear pressure springs [D].
6. Replace the pressure roller [E] (2 bushings and E-rings).



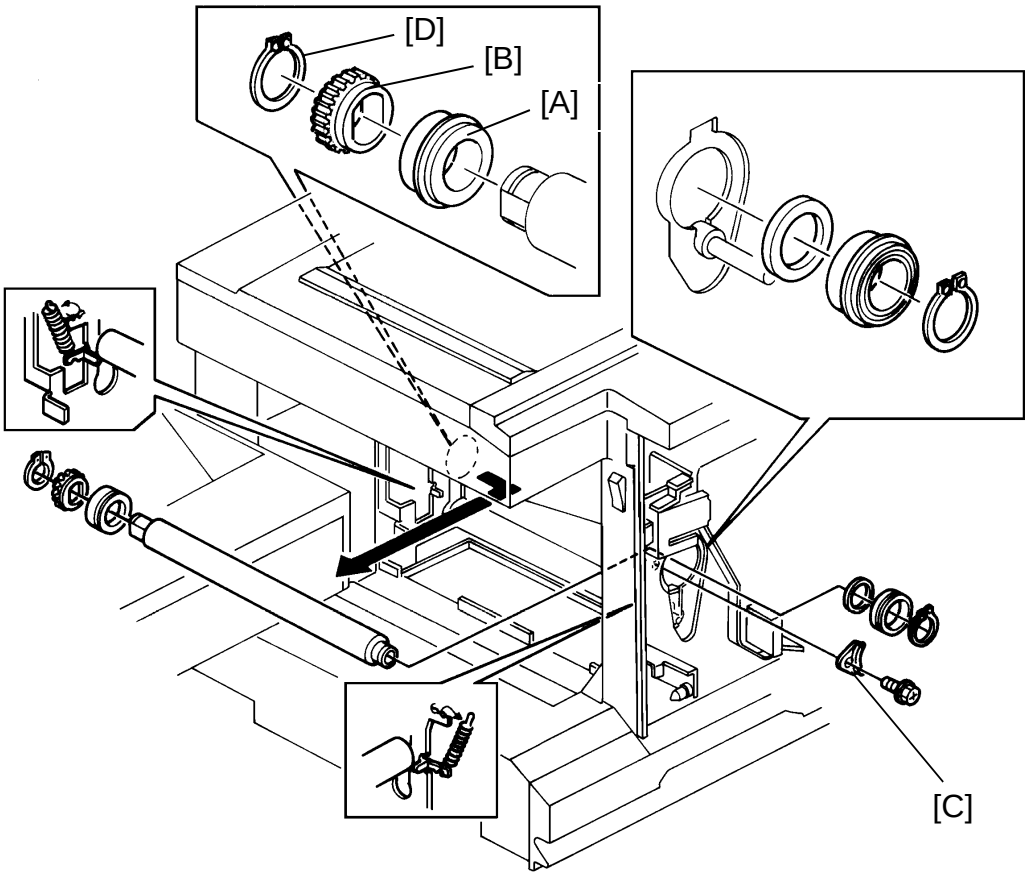
- To install -

1. Install the bushings on both the front and rear roller shafts (1 E-ring each).
2. After setting the pressure roller, install the rear pressure spring [A] while sliding the bushing [B] up along with the rear frame as shown.
3. Slide the bushing up along with the front frame and pull the lower spring bracket [C] up as shown.
4. To hold the spring bracket, insert a screw driver into the cutout [D] on the front frame as shown.
5. Install the front pressure spring [E].

7.4 HOT ROLLER REPLACEMENT



1. Remove the exit unit. (See Exit Unit Removal.)
2. Remove the fusing lamp. (See Fusing Lamp Replacement.)
3. If the duplex tray is installed, remove the turn guide plate (2 screws). If not, remove the fusing bottom plate (2 screws).
4. Remove the exit paper guide (1 screw).
5. Remove the front and rear pressure springs [A].
6. Remove the C-ring [B] (front side).
7. Remove the bearing stopper [C] (1 screw), and remove the bearing [D] and spacer [E].
8. Remove the rear C-ring [F].
9. Slide the hot roller out. The gear [G] will drop off the hot roller shaft.
10. Replace the hot roller (1 bearing [H]).



- To install -

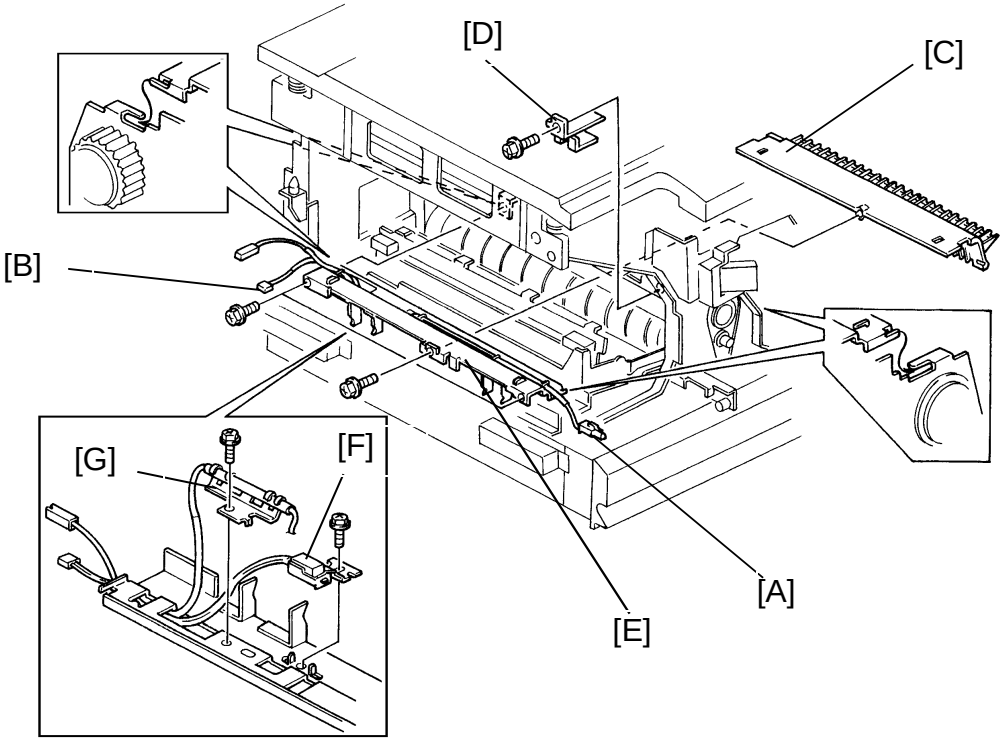
1. Set the rear bearing [A] on the rear frame.
2. Insert the rear end of the hot roller shaft through the rear bearing.
3. Place gear [B] on the rear end of the shaft.
4. Install the bearing stopper [C].
5. Set the rear side C-ring [D] on the rear shaft.

NOTE: a) Peel off 3 cm (1 inch) from both ends of the protective sheet before installing a new hot roller.

b) Before setting the pressure springs, remove the rest of the protective sheet.

c) Before reinstalling the pressure springs, refer to the installation procedure in the Pressure Roller Replacement Section.

7.5 THERMISTOR AND THERMOFUSE REPLACEMENT

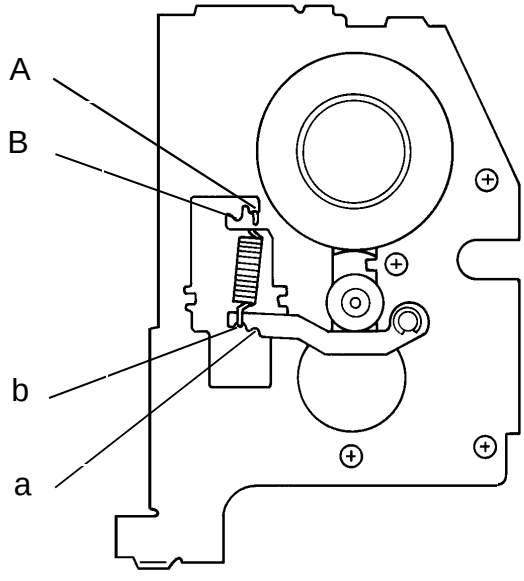


1. Turn off the main switch and unplug the power supply cord.
2. Open the front cover and remove the left inner cover.
3. Lower the transport guide plate.
4. Disconnect the fusing lamp connector [A].
5. Remove the rear cover and remove the ac drive board. (See Fusing Lamp Replacement.)
6. Disconnect the thermistor connector [B].
7. Open the exit unit and remove the cleaning unit and fusing unit cover [C] (1 screw each).
8. Remove the left upper cover. (See Left Upper Cover Removal.)
9. Remove the safety switch actuator bracket [D] (1 screw).
10. Remove the upper fusing stay [E] as shown (2 screws).
11. Replace the thermistor [F] and/or thermofuse [G] (1 screw each).

NOTE: a) When reinstalling the stay [E], make sure that the front and rear hooks stay are inserted into the side frames as shown.

b) Make sure that each harness is properly wired as shown.

7.6 FUSING PRESSURE ADJUSTMENT

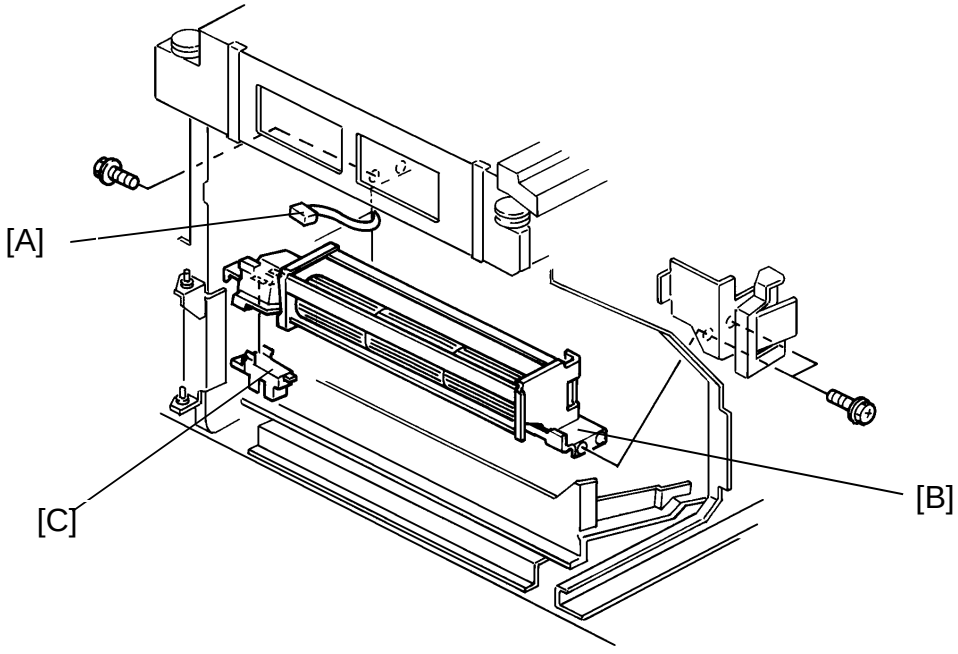


<Fusing pressure adjustment combinations>

Spring Position Setting	
A – a	If poor fusing occurs
A – b	Factory Setting
B – a	
B – b	If paper creasing occurs

The fusing pressure can be set at three different levels. Adjust the pressure spring position if poor fusing occurs or if the copy paper becomes creased. (See Pressure Roller Replacement.)

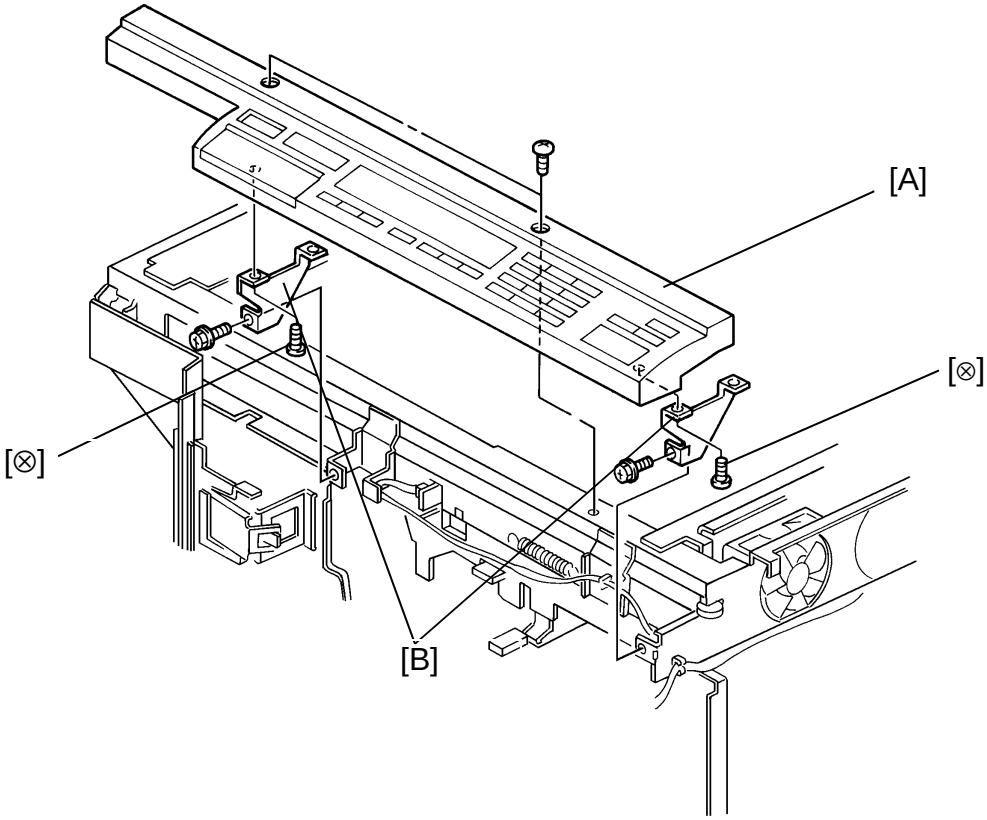
7.7 FUSING EXIT SENSOR REPLACEMENT



1. Turn off the main switch.
2. Open the front cover and exit unit.
3. Remove the following parts:
   - Left inner cover
   - Left lower and upper covers
   - Rear cover
   - AC drive board
4. Disconnect the exit sensor connector [A].
5. Remove the exhaust blower motor bracket [B] (4 screws).
6. Replace the exit sensor [C].

8. OTHERS

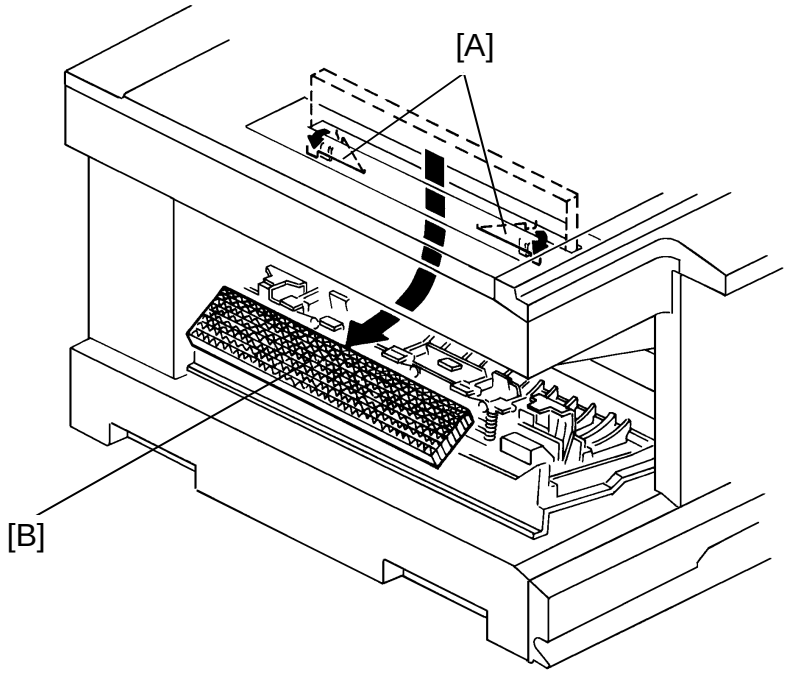
8.1 OPERATION PANEL REMOVAL



1. Open the front cover and remove the following covers:
   - Right and left inner covers
   - Right Cover
   - Rear Cover
2. Disconnect the connectors from the main board (CN130 and CN131).
3. Remove the operation panel [A] (4 screws).
4. Remove the brackets [B] from the old operation panel and install them on the new operation panel.
5. Install the new operation panel on the machine.

NOTE: The screws [⊗] are tapping screws. Do not tighten them too much as this will strip the resin threads.

8.2 OZONE FILTER REPLACEMENT



1. Open the exit unit.
2. Unhook the front and the rear support levers [A].
3. Replace the ozone filter [B].

9. COPY QUALITY ADJUSTMENT

- General Information -

Image density is affected by the following factors:

(1) Light Intensity
(2) Bias Voltage
(3) Toner Density
(4) Grid Voltage
(5) Charge Corona Current

The items listed above must be kept in balance to maintain correct image density.

In the field, image density should be adjusted first by changing the exposure lamp voltage. If results are unsatisfactory, the bias voltage can be changed. Also, if requested from the customer, the overall image density can be changed by changing the toner density. Normally, this should be kept at the normal position (factory setting).

The grid voltage and charge corona current are carefully adjusted at the factory. Any adjustment out of the adjustment standard will result in overtoning, toner scattering, dirty background, or light image density problem. The grid voltage and charge corona current adjustment should be done only when replacing the CC/G/B power pack or correct certain problems with image density after checking the other possible causes.

9.1 LIGHT INTENSITY ADJUSTMENT

When:	Every Call
Purpose:	To maintain the correct light intensity
Adjustment Standard:	Level 2 of the gray scale on the OS-A3 chart should be just visible on the copy when the 4th manual image density level is selected.
Measure:	SP Mode #48
How:	Changes the ac drive board output voltage.

1. Turn off the main switch.
2. Clean the following parts:

Item No.	Section	Method
(1)	Optics (mirrors, lens, reflectors, shield glass, exposure glass)	Damp cotton, silicine cloth, and blower brush
(2)	ID sensor	Blower brush
(3)	Corona wires (charge, transfer, and separation) and casing.	Alcohol or water
(4)	QL, PTL, Erase Lamp	Dry Cloth

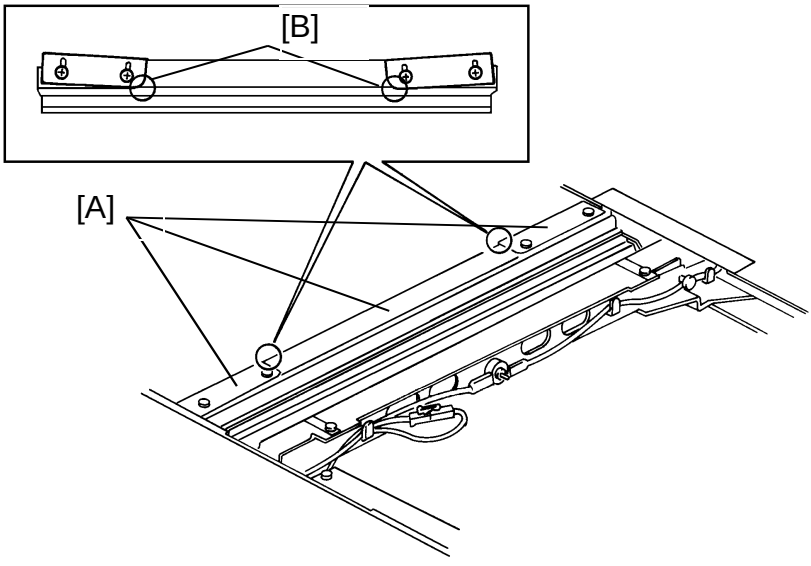
3. Set the OS-A3 chart and make a full size copy at manual image density level #4 (center).

   NOTE: Make sure that the data in SP mode #37 is set to "0" (standard value).

4. Confirm that level 2 of the gray scale is just visible on the copy. If the image density is not correct, proceed to the following steps.
5. Enter the lamp voltage setting mode using the numeral keys (SP mode #48).
6. Change the data with the numeral keys as follows:
   If the image density is too dark: Increase the data number
   If the image density is too light: Decrease the data number
7. Confirm that the image density is within the adjustment standard.
8. Perform the ADS adjustment. (See page 5-96.)

9.2 UNEVEN EXPOSURE ADJUSTMENT

When:	The exposure is uneven.
Purpose:	To maintain even exposure.
Adjustment Standard:	The side-to-side variation of the gray scales on the test chart should be less than one level.
Measure:	Move the exposure adjustment plates.
How:	Changes the position of the adjustment plates to make the light intensity from the exposure lamp even across its length.



NOTE: Do not adjust the charge corona wire height to correct the uneven image density on the copy.
When adjusting the wire height, use the drum shoe. (See Charge Corona Current Adjustment.)

1. Clean the optics components and the charge corona wire.
2. Place a test chart on the expsure glass and make a A3/LDG copy.
3. If the side-to-side variations of the gray scales is not within the adjustment standard, turn off the main switch and remove the exposure glass. (See Exposure Glass Removal.)
4. Position the adjusting plates [A] so that the copy image meets the adjustment standard. The leading edges of the three adjustment plates must be aligned [B] to avoid white streaks.

9.3 BIAS VOLTAGE ADJUSTMENT

When:	1. The image is blurred even though the image density in black solid areas is acceptable. 2. Dirty background. The problem is not caused by excess toner and cannot be solved by adjusting light intensity.
Purpose:	To improve the copy image
Measure:	SP Mode #37
How:	Changes the bias voltage while the image area on the drum is being developed.

SP Mode #37

Data	0	1	2	3	4
Bias Voltage [V]	V_0	V_0 + 40	V_0 + 20	V_0 - 20	V_0 - 40
Image Density	Normal	Darkest	Darker	Lighter	Lightest

NOTE: V_0 is the standard voltage applied to the development roller.

1. Make a copy after adjusting the light intensity.
2. If the image is blurred:
   Decrease bias voltage by one step and readjust light intensity.

   If the background is dirty:
   Increase bias voltage by one step and readjust light intensity.

9.4 TONER DENSITY ADJUSTMENT

When:	Customer wants to change the overall image density of the copies.
Purpose:	To change toner concentration inside development unit.
Measure:	SP Mode #33
How:	Changes the ID pattern bias voltage and either raises/lowers the toner supply threshold.

9.5 FIXED TONER SUPPLY MODE SELECTION

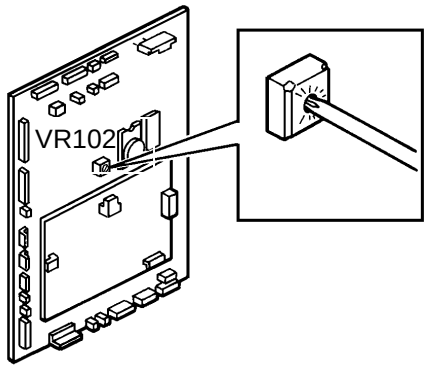
When:	A problem with the ID sensing system cannot be corrected during a service call. (Detect supply mode does not function.)
Purpose:	To leave Detect mode and manually turn on the toner supply system
Measure:	SP Mode #30
How:	Turns on the toner supply clutch every copy cycle.

9.6 TONER SUPPLY RATIO SELECTION

When:	The factory setting for toner supply amount is not appropriate for the type of original in use.
Purpose:	To adjust the toner supply amount
Adjustment Standard:	Detect Mode : 15% (Factory Setting) Fixed Mode : 7% (Factory Setting)
Measure:	Detect Mode : SP Mode #31 Fixed Mode : SP Mode #32
How:	Changes the toner supply clutch on period.

9.7 ID SENSOR (Vsg) ADJUSTMENT (SP MODE #54)

When:	1. Check Vsg at every call, and adjust Vsg if it is out of adjustment standard. 2. At replacement of the following parts: • ID sensor • Main board • Drum 3. A toner supply problem occurs.
Purpose:	To makes sure that ID sensor mode works correctly.
Adjustment Standard:	Vsg = 4.0 ± 0.2 volts
Measure:	SP Mode #54
How:	Changes the light intensity of the ID sensor LED. The Vsg voltage is displayed in the magnification indicator.



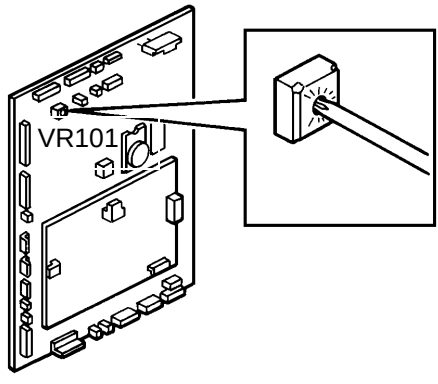
1. Turn off the main switch and clean the following parts:

Item No.	Section	Method
(1)	Optics (mirrors, lens, reflectors, shield glass, exposure glass)	Damp cotton, silicine cloth, and blower brush
(2)	ID sensor	Blower brush
(3)	Corona wires (charge, transfer, and separation) and casing	Alcohol or water
(4)	QL, PTL, Erase Lamp	Dry Cloth

2. Reinstall all the parts.
3. Place five sheets of A3 (LDG) paper on the exposure glass.
4. Check Vsg using SP mode #54. Adjust Vsg by turning VR102 (main board) if Vsg is out of adjustment standard.

9.8 ADS (Auto Image Density Sensor) ADJUSTMENT

When:	1. After light intensity adjustment 2. When replacing the following parts: • Main board • AC drive board. 3. ADS voltage is not within the adjustment standard.
Purpose:	To maintain correct ADS mode operation
Adjustment Standard:	ADS Voltage = 2.5 ± 0.1 volts
Measure:	SP Mode #56
How:	Changes the main board ADS output voltage. The voltage reading is displayed in the magnification indicator.



1. Clean the optics (mirrors, lens, reflectors, shield glass, and exposure glass).
2. Place five sheets of A3 (LDG) paper on the exposure glass.
3. Select SP Mode #56 and press the Start key.
4. If the voltage is not within the adjustment standard, adjust it by turning VR101 on the main board.

9.9 VERTICAL MAGNIFICATION ADJUSTMENT

When:	The vertical magnification is not within the adjustment standard.
Purpose:	To maintain proper vertical magnification
Adjustment Standard:	Less than ± 0.5% difference between original and copy
Measure:	SP Mode #43 (0.2%/step, 16 steps)
How:	Changes the scanner speed compensation.

1. Place a 150 mm scale perpendicular to the left scale on the exposure glass.
2. Adjust the vertical magnification using SP Mode #43. Make three copies to check the magnification.

9.10 HORIZONTAL MAGNIFICATION ADJUSTMENT

When:	The horizontal magnification is not within the adjustment standard. After loosening the first scanner wire clamps.
Purpose:	To maintain proper horizontal magnification.
Adjustment Standard:	Less than ± 0.5% difference between original and copy
Measure:	1. Adjust the position of the first scanner wire clamps (rough adjustment). 2. SP Mode #44 (0.2%/step, 16 steps) (fine adjustment)
How:	1. Changes the distance between the original and the drum. 2. Changes the lens home position.

- Rough Adjustment -

1. Change the data of SP mode #44 to 8 (default value).
2. Position the scanner wire clamps using the scanner positioning pins. (See Scanner Wire Installation.)

- Fine Adjustment -

3. Place a 150mm scale parallel to the left scale on the exposure glass.
4. Adjust the horizontal magnification using SP mode #44. Make three copies to check the magnification.

9.11 FOCUS ADJUSTMENT

When:	The copy image is out of focus. After adjusting the horizontal magnification
Purpose:	To maintain proper focus
Adjustment Standard:	Copy image in focus
Measure:	SP Mode #47 (16 steps)
How:	Adjusts the 4th/5th mirror assembly home position, changing the the distance between the original and the drum surface.

1. Make three A3/LDG copies with the test chart.
2. Adjust the focus using SP mode #47. Check the text on the copies.

9.12 ERASE MARGIN ADJUSTMENT

When:	The leading edge erase margin is not within the adjustment standard.
Purpose:	To maintain the correct leading erase margin
Adjustment Standard:	2.5 ± 1.5 mm (0.1 ± 0.06")
Measure:	SP Mode #41 (0.5mm/step, 16 steps)
How:	Changes the erase lamp on period.

1. Place a 150 mm scale perpendicular to the left scale on the exposure glass.
2. Adjust the leading edge erase margin using SP mode #41. Make three copies and check the erase margin.

9.13 REGISTRATION ADJUSTMENT

When:	Registration is not within the adjustment standard.
Purpose:	To maintain proper registration
Adjustment Standard:	0 ± 2 mm (0 ± 0.08")
Measure:	SP Mode #42 (0.5mm/step, 16 steps)
How:	Changes the registration roller start timing.

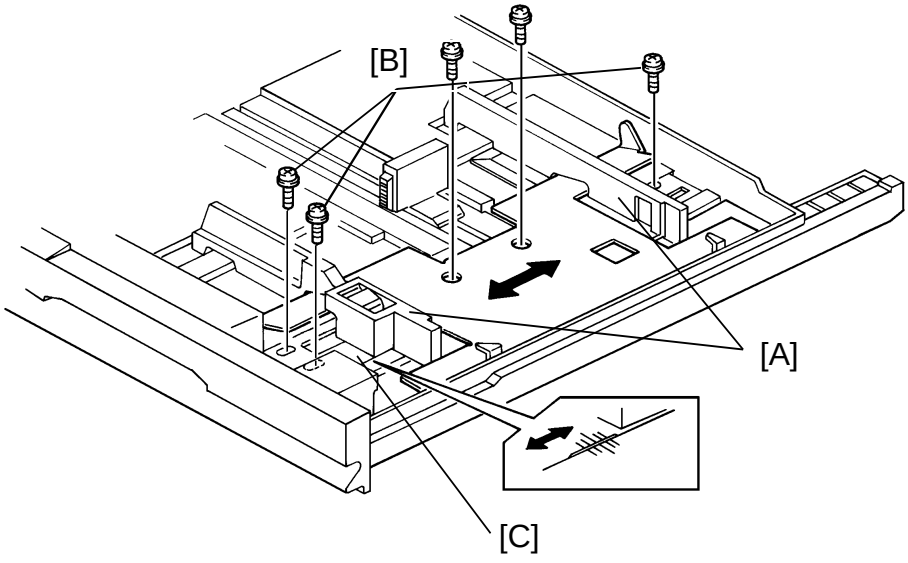
1. Place a 150 mm scale perpendicular to the left scale on the exposure glass.
2. Adjust the registration using SP mode #42. Make three copies and check the registration.

9.14 SIDE-TO-SIDE REGISTRATION ADJUSTMENT

When:	Side-to-side registration is not within the adjustment standard.
Purpose:	To maintain the proper side-to-side registration
Adjustment Standard:	0 ± 2 mm (0 ± 0.08")
Measure:	1. Change the lens position. 2. Change the sIde fence position in the paper tray.
How:	Shifts the copy image.

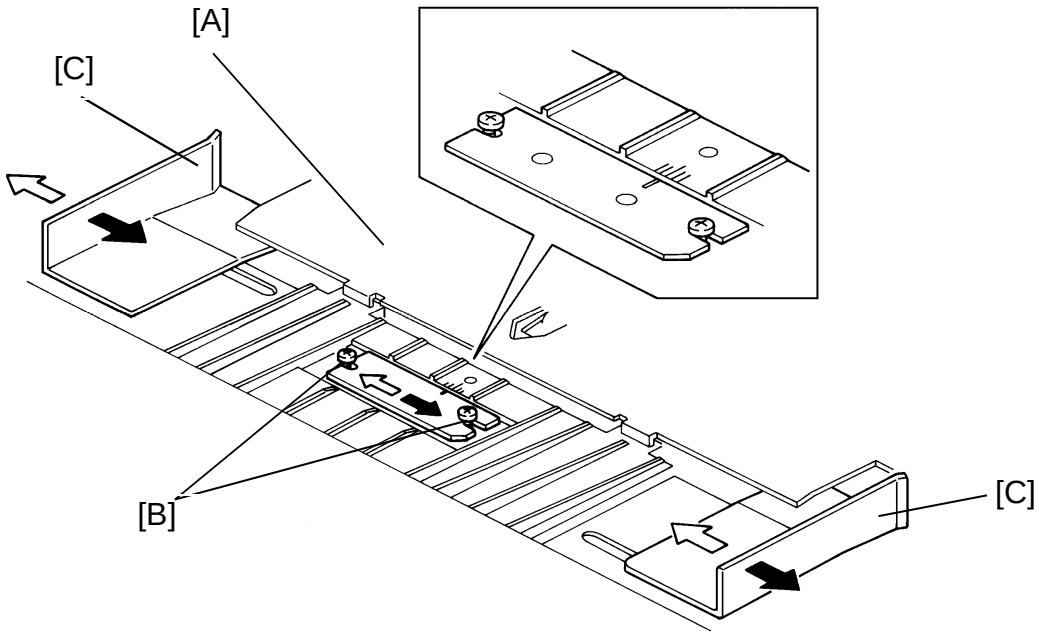
NOTE: a) When side-to-side registration is incorrect and only the paper tray or duplex unit is being used, adjust the side fence position.

b) When side-to-side registration is incorrect for both the first paper feed station and the second paper feed station, adjust the lens position. Check the adjustment by making a copy from the first paper feed station. Then, make a copy from the paper tray feed station and adjust the paper tray or duplex unit side fences if necessary.



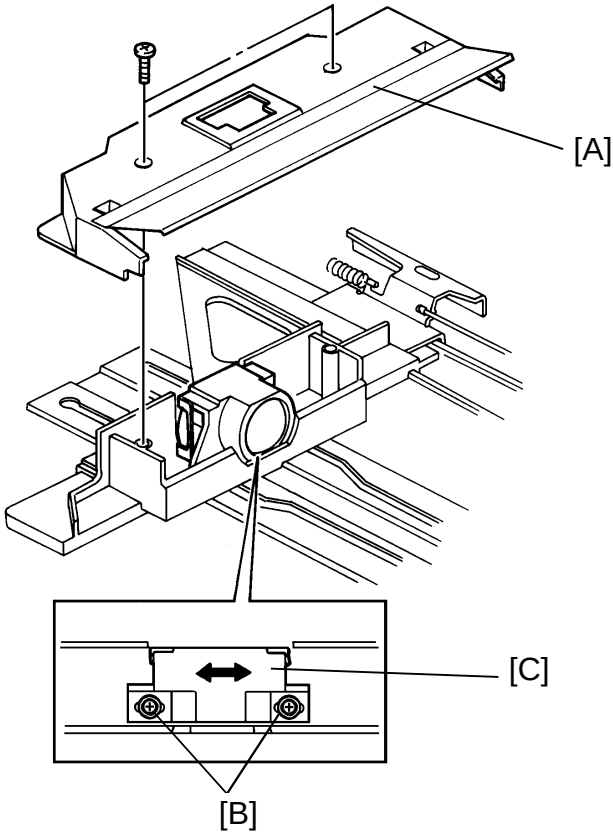
- Side Fence Adjustment (Paper Tray) -

1. Pull the paper tray out.
2. Move the side fences [A] to the A4 lengthwise position.
3. Loosen the five screws [B].
4. Set the side fences to the desired position [C].



- Side Fence Adjustment (Duplex Unit) -

1. Pull the duplex unit [A] out.
2. Loosen the two screws [B].
3. Set the side fences to the desired position [C].



- Lens Position Adjustment -

1. Turn off the main switch and remove the exposure glass. (See Exposure Glass Removal.)
2. Remove the lens housing cover (2 screws) and lens cover [A] (2 screws).
3. Loosen two screws [B] and shift the lens [C] from side-to-side to the adjust the registration.

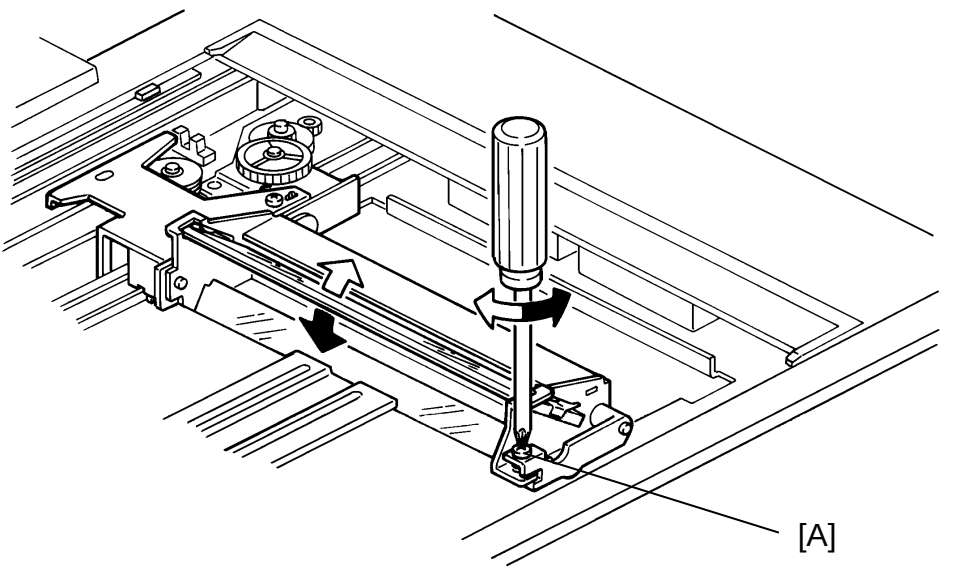
NOTE: Do not move the lens more than 2 mm (from the center position) in either direction (front/rear). Otherwise, the lens may contact the lens unit rail while moving from home position to the selected reduction or enlargement position.

4. Make sure the lens moves smoothly when charging the magnification ratio.

9.15 4TH/5TH MIRROR HEIGHT ADJUSTMENT

When:	Parallelogram (skewed) image appears.
Purpose:	To maintain the proper copy image
Measure:	Turn 4th/5th mirror height adjustment screw.
How:	Changes the 4th/5th mirror height

CAUTION: Never perform this adjustment until you have positively verified that the source of the skewing is optical and not in the paper path.

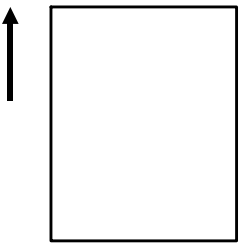


1. Turn off the main switch and remove the exposure glass. (See Exposure Glass Removal.)
2. Remove the lens housing cover (2 screws).
3. Adjust the 4th/5th mirror height by turning the screw [A]. Refer to the arrows in the illustration.

SECTION 6
TROUBLESHOOTING

1. COPY QUALITY

1.1 BLANK COPY (WHITE COPY)



- Phenomenon -

White or almost white copy

- Possible Causes -

1. Charge is not applied.
   - CC/G/B bias power pack (charge or grid) failure
   - Poor contact of power pack lead wires
   - Broken charge corona wire
   - Leak in insulator or endblock

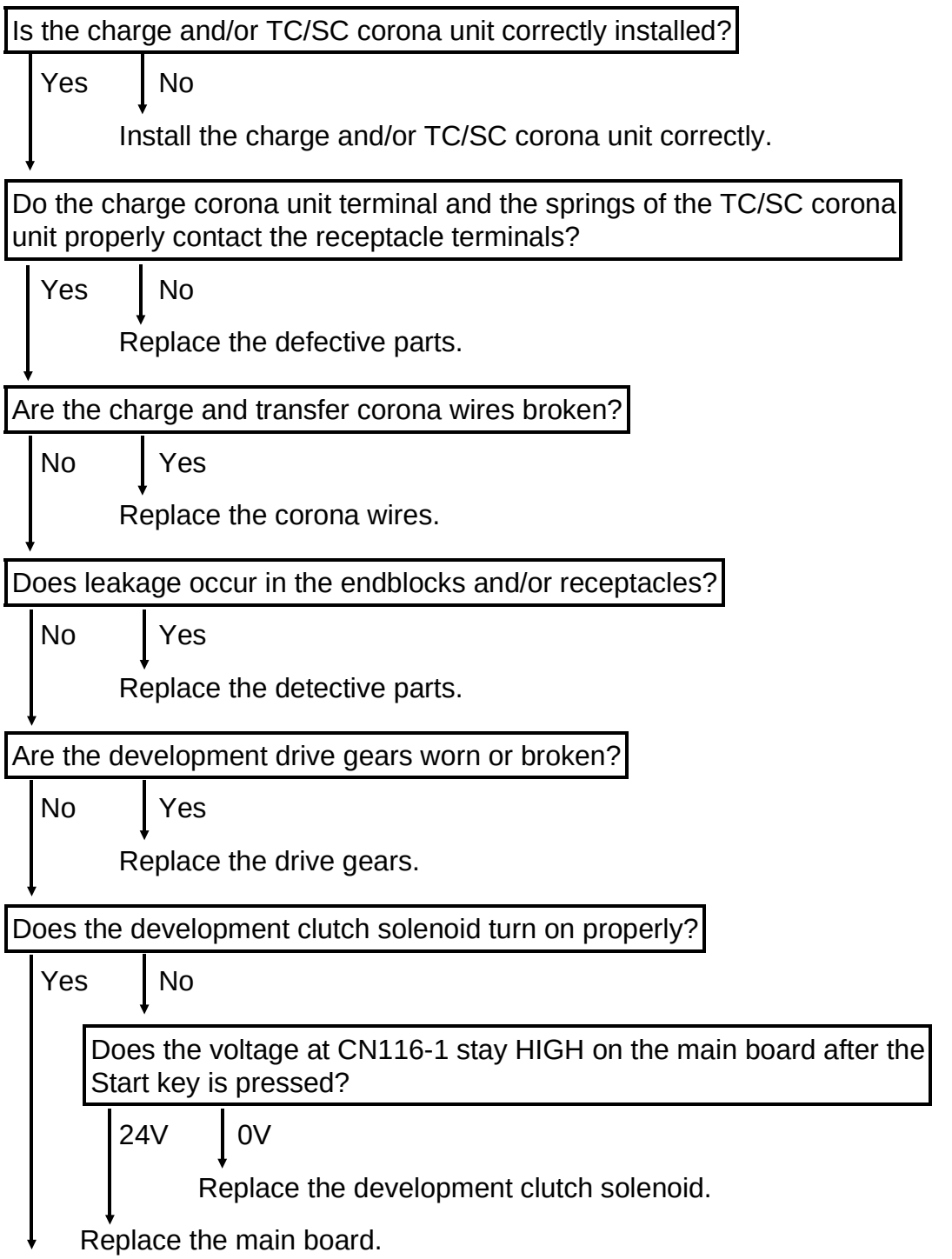
2. Copy image is not transferred to the paper.
   - TC/SC power pack (transfer) failure
   - Poor contact of power pack lead wires
   - Poor contact of transfer corona wire
   - Leak in insulator or endblocks

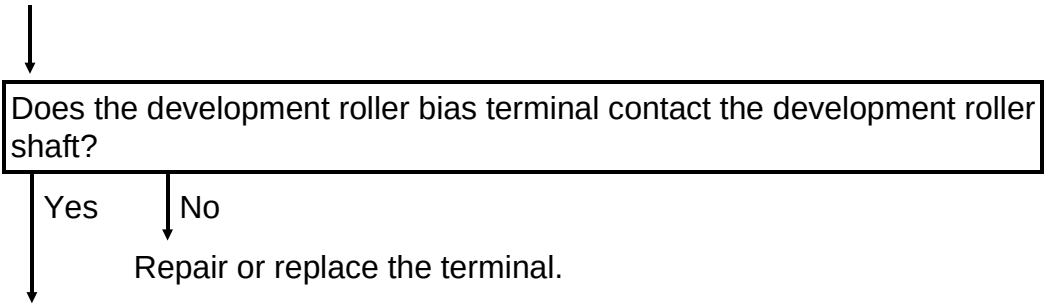
3. Development roller does not rotate.
   - Broken drive gear
   - Defective development clutch solenoid

4. The development roller is not properly grounded.

5. Poor drum sensitivity
   - Drum exposed to fluorescent light or direct sunlight for long period of time.
   - Drum exposed to ammonia gas or fumes for long period of time.

- Action -


Is the charge and/or TC/SC corona unit correctly installed?
Yes
No
Install the charge and/or TC/SC corona unit correctly.
Do the charge corona unit terminal and the springs of the TC/SC corona unit properly contact the receptacle terminals?
Yes
No
Replace the defective parts.
Are the charge and transfer corona wires broken?
No
Yes
Replace the corona wires.
Does leakage occur in the endblocks and/or receptacles?
No
Yes
Replace the detective parts.
Are the development drive gears worn or broken?
No
Yes
Replace the drive gears.
Does the development clutch solenoid turn on properly?
Yes
No
Does the voltage at CN116-1 stay HIGH on the main board after the Start key is pressed?
24V
0V
Replace the development clutch solenoid.
Replace the main board.



Check the following points:

- CN112-6 (charge trigger line) and CN112-4 (Grid trigger line)
  (1) If the signal stays HIGH after the Start key is pressed, replace the main board.

  (2) If the charge corona does not turn on even if the signal changes to LOW, replace the CC/G/B power pack.

- CN126-3 (Transfer trigger line)
  (1) If the signal stays HIGH after the Start key is pressed, replace the main board.

  (2) If the transfer corona does not turn on even if the signal changes to LOW, replace the TC/SC power pack.

If there is no problem with the signal lines, replace the drum if the sensitivity does not recover even when the drum is not exposed to light.

1.2 DIRTY BACKGROUND

- Phenomenon -

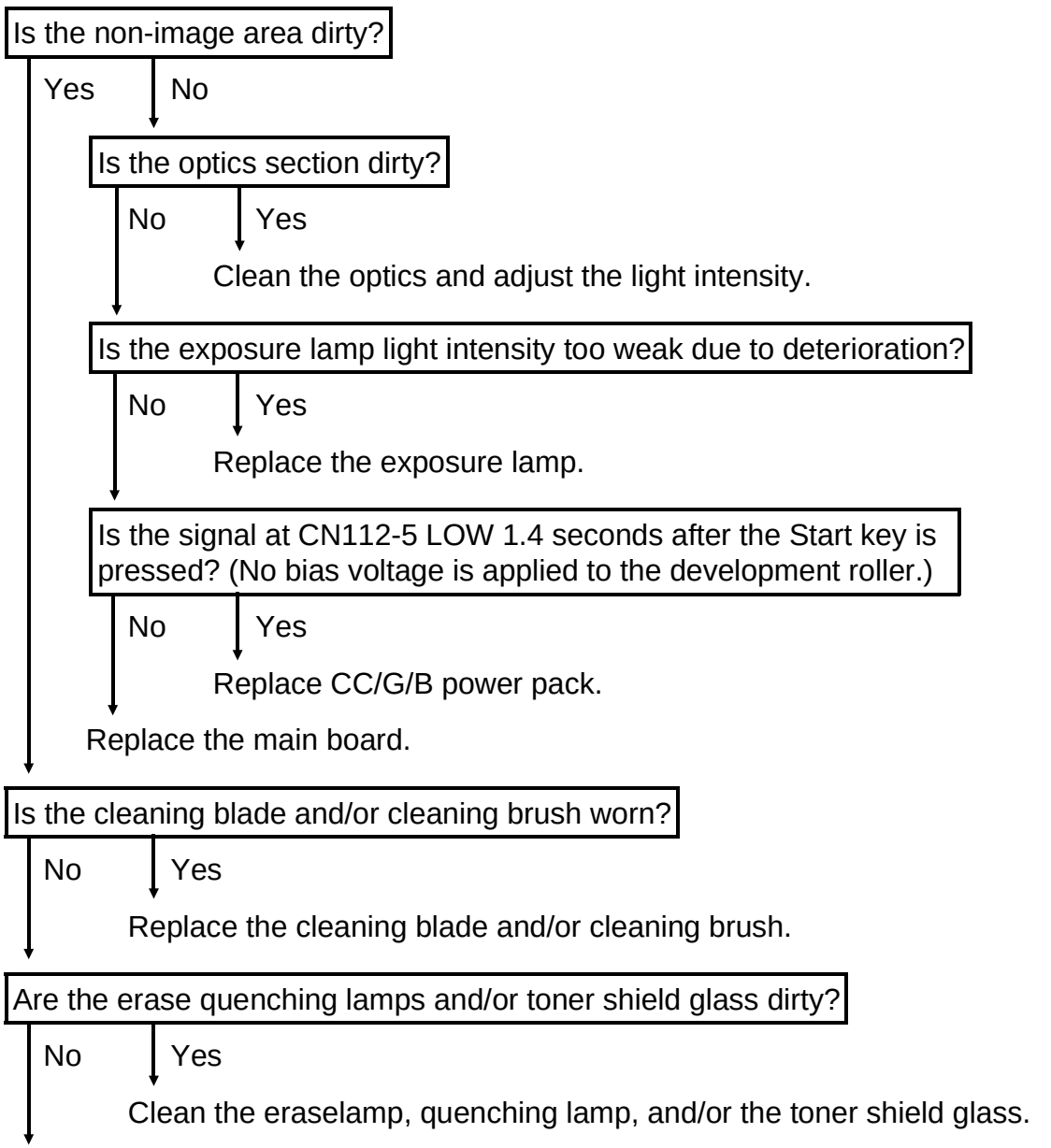
1. Dirty background at image density level 4 (manual setting)
2. When newspapers are copied, the background is dirty even at level 7.
3. ADS copies have a dirty background.

- Possible Causes -

1. Dirty optics
2. Toner scattering
   - High toner density
   - The inlet seal of the development unit is stripped off.
   - The doctor gap is too wide.
3. The exposure lamp is not bright enough. This may be caused by deterioration of the exposure lamp or low lamp voltage.
4. In ADS mode, Vde (reflected light from the original) is too high.
5. The ADS optical fiber is cut or bent.
6. The development bias is grounded.

- Action -

Make a copy in reduction mode at manual image density level 4.


Is the non-image area dirty?
Yes
No
Is the optics section dirty?
No
Yes
Clean the optics and adjust the light intensity.
Is the exposure lamp light intensity too weak due to deterioration?
No
Yes
Replace the exposure lamp.
Is the signal at CN112-5 LOW 1.4 seconds after the Start key is pressed? (No bias voltage is applied to the development roller.)
No
Yes
Replace CC/G/B power pack.
Replace the main board.
Is the cleaning blade and/or cleaning brush worn?
No
Yes
Replace the cleaning blade and/or cleaning brush.
Are the erase quenching lamps and/or toner shield glass dirty?
No
Yes
Clean the eraselamp, quenching lamp, and/or the toner shield glass.

If toner scattering occurs, see the toner scattering section of the manual.

If the dirty background occurs only in ADS mode, do the following:

- If the ADS voltage is not within 2.5 ±0.1 volts standard voltage, readjust the ADS voltage.
- If the signal at CN101-6 stays HIGH, check the harness and/or sensor, and replace defective parts.
- If the signal at CN101-5 stays LOW, replace the main board.

NOTE: After the light intensity is adjusted, check and/or adjust the ADS voltage using SP mode #56.

1.3 UNEVEN IMAGE DENSITY

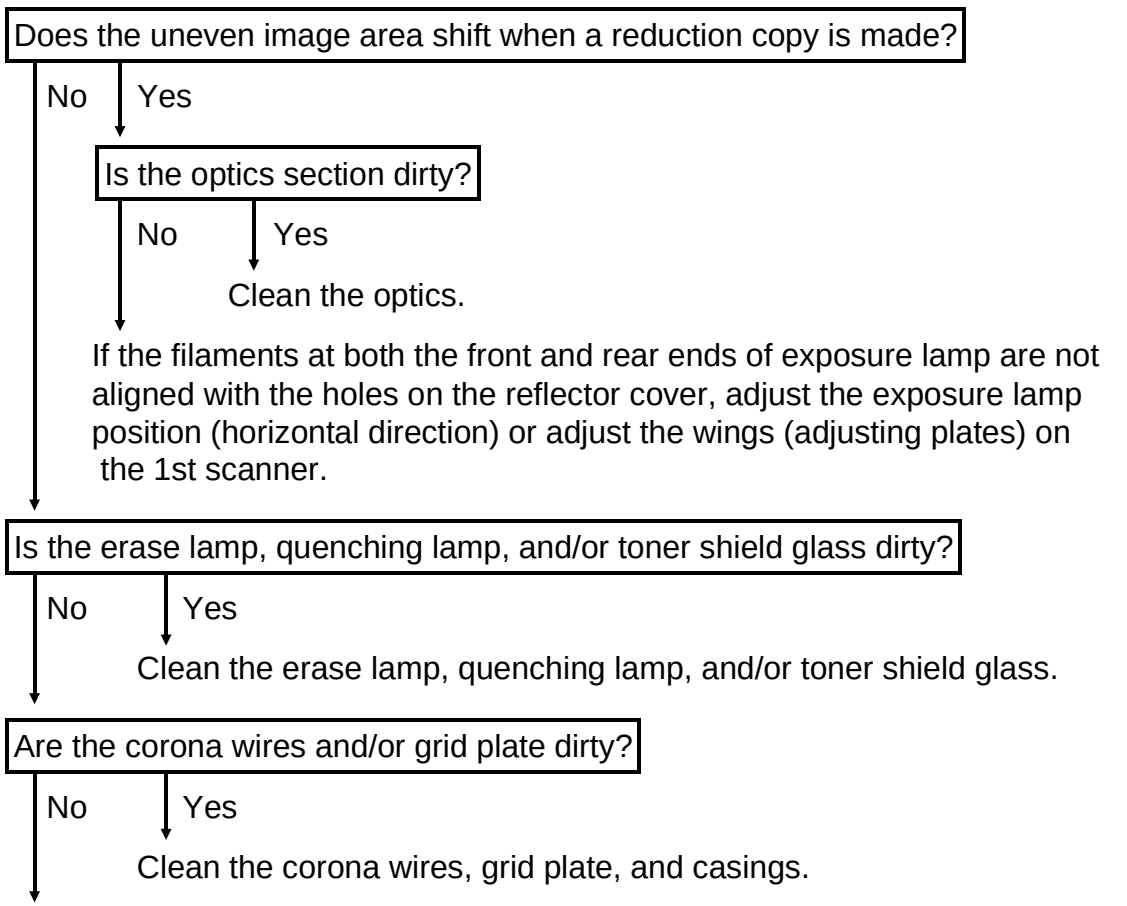
- Phenomenon -

Uneven image density appears on the copies.

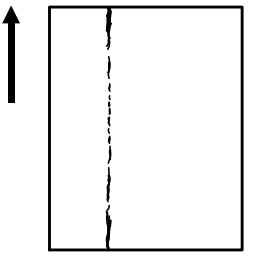
- Possible Cause -

1. Dirty optics
2. Uneven exposure lamp horizontal position.
3. Dirty corona wires or grid
4. Uneven height of charge corona wire.

- Action -


Does the uneven image area shift when a reduction copy is made?
No
Yes
Is the optics section dirty?
No
Yes
Clean the optics.
If the filaments at both the front and rear ends of exposure lamp are not aligned with the holes on the reflector cover, adjust the exposure lamp position (horizontal direction) or adjust the wings (adjusting plates) on the 1st scanner.
Is the erase lamp, quenching lamp, and/or toner shield glass dirty?
No
Yes
Clean the erase lamp, quenching lamp, and/or toner shield glass.
Are the corona wires and/or grid plate dirty?
No
Yes
Clean the corona wires, grid plate, and casings.
Adjust the charge corona wire height using a drum shoe.

1.4 VERTICAL BLACK BANDS



- Phenomenon -

Vertical black bands appear on the copy paper.

- Possible Causes -

1. Dirty optics
2. Dust between the cleaning blade and drum
3. Edge of the cleaning blade deformed
4. Deformed cleaning brush
5. Deformed inlet seal on the development unit

- Action -

Do the black bands shift when a reduction copy is made?

No

Yes

Check and clean the optics section (including the toner shield glass).

Press the blade release lever down two or three times to clean the edge of the the cleaning blade. If the black bands still appear, go to the next step.

Is the edge of the cleaning blade deformed?

No

Yes

Replace the cleaning blade.

Is the cleaning brush deformed?

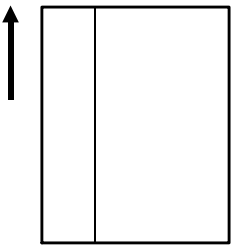
No

Yes

Replace the cleaning brush.

If the inlet seal on the development unit is deformed, replace the inlet seal plate and the seal as a set.

1.5 VERTICAL BLACK LINES



- Phenomenon -

Thin black lines appear on the copy.

- Possible Causes -

1. Scratched cleaning blade
2. Dirty or scratched exposure glass and/or dirty or scratched mirrors
3. Scratched or dirty drum
4. Scratched hot roller

- Action -

Do the black lines shift when a reduction copy is made?

- No ↓
- Yes → Clean or replace the exposure glass or mirrors.

Is the toner shield glass scratched?

- No ↓
- Yes → Replace the toner shield glass.

Is the edge of the cleaning blade scratched?

- No ↓
- Yes → Replace the cleaning blade.

Is the hot roller scratched?

- No ↓
- Yes → Check whether black lines appear on the copy by stopping the copy paper in the transport section. If no black lines appear, replace the hot roller.

Check whether the drum is scratched or toner is built-up on the drum.

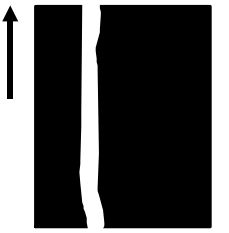
- If toner is built-up on the drum, clean the drum with damp cloth.
- If the drum is scratched, replace the drum.

NOTE: When replacing the drum, perform drum initial setting using SP mode #66.

1.6 VERTICAL WHITE LINES OR BANDS—1 (DULL OR BLURRED)

- Phenomenon -

Dull or blurred white lines appear on the copy.



- Possible Causes -

1. Dirty or deteriorated charge corona wire.
2. Dirty or deformed grid plate.
3. The inlet seal on the development unit is damp or is contaminated with oil.

- Action -

Is the charge corona wire and/or grid plate dirty?

No

Yes → Clean the charge corona wire and/or grid plate.

Is the inlet seal damp or contaminated with oil?

No

Yes → Clean the inlet seal with a dry cloth. If the problem is not corrected, replace the inlet seal plate and the seal as a set.

Is the grid plate deformed?

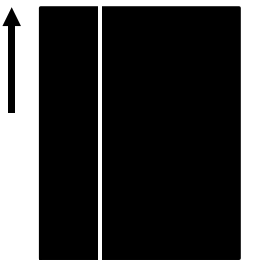
No

Yes → Replace the grid plate.

Replace the charge corona wire.

1.7 VERTICAL WHITE LINES OR BANDS—2 (THIN, DISTINET)

- Phenomenon -



Vertical white lines appear on the copy.

- Possible Causes -

1. Paper dust on the edge of cleaning blade
2. Scratched drum
3. Scratched hot roller

- Action -

Press the cleaning blade release lever down several times. Make a copy and if the white lines still occur, go to the next step.

↓

Make a copy and stop the machine when the paper reaches the transport section. Do white lines appear on the copy?

No ↓

Replace the hot roller if it is scratched.

Yes ↓

Replace the drum if it is scratched.

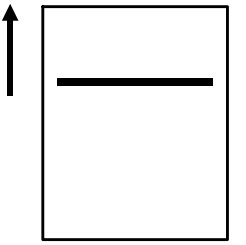
NOTE: If the drum is scratched, find out what caused the scratches on the drum and correct the problem.

- Paper Jam
- Incorrect positioning of the pick-off pawls
- Foreign substances on the cleaning brush and/or blade
- Carrier leakage

When replacing the drum, perform the drum initial setting using SP mode #66.

1.8 HORIZONTAL BLACK/WHITE LINES

- Phenomenon -



Black/white lines perpendicular to the paper feed direction appear on the copy image.

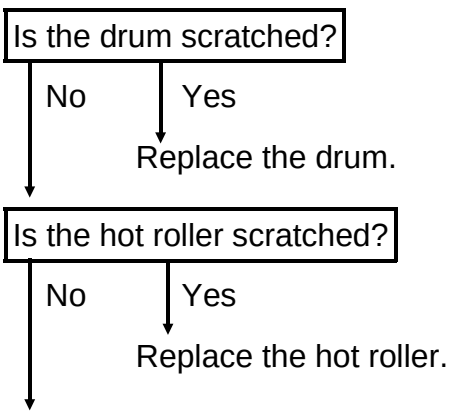
- Possible Causes -

1. Drum is scratched.
   If black lines appear at 251mm intervals, the cause is a scratched drum or toner build up.

2. Hot roller is scratched.
   If black lines appear at 125mm intervals, the cause is a scratched hot roller.

3. Toner adhered to the drum surface.
   Due to insufficient cleaning, foreign matter may be build up on the blade, causing toner to stick to the drum surface when the drum stops.

- Action -



If toner adheres to the drum surface, clean the drum with water. Also clean or replace the cleaning blade and/or cleaning brush.

1.9 JITTER

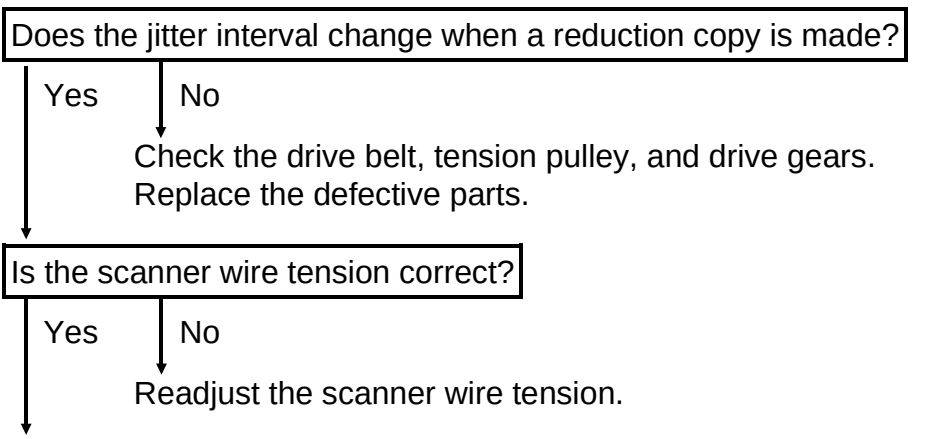
- Phenomenon -

Jitter appears on the copy.

- Possible Causes -

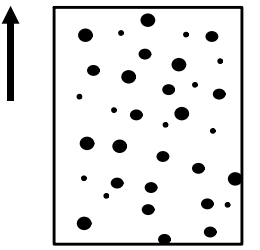
1. Vibration in drive mechanism.
2. Scanner not moving smoothly.

- Action -


Does the jitter interval change when a reduction copy is made?
Yes
No
Check the drive belt, tension pulley, and drive gears.
Replace the defective parts.
Is the scanner wire tension correct?
Yes
No
Readjust the scanner wire tension.
Clean the scanner guide rails and check the scanner drive.

1.10 BLACK SPOTS ON THE COPY IMAGE

- Phenomenon -



1. The grid voltage is not applied correctly.
   - Poor contact between charge corona casing and grid spring
   - CC/G/B power pack defective
   - Main board defective

- Action -

Is there a good electrical contact between the charge corona casing and the grid spring?

Yes ↓

No → Repair the poor contact and/or replace any parts if needed.

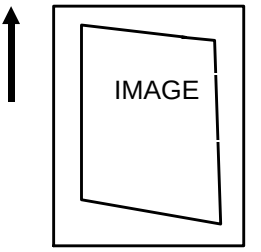
Check the voltage at CN112-1 on the main board.

0V ↓

Not 0V → Replace the main board.

Replace the CC/G/B power pack.

1.11 SKEWED (OPTICAL) COPY IMAGE



- Phenomenon -

The copy image is skewed (parallelogram shape).

The sides of the copy image are straight, but the leading and trailing edges are skewed.
(This differs from the paper path type of skewing.)

- Possible Causes -

1. 4th/5th mirror assembly is not parallel with the 1st and 2nd scanners.
2. Mirrors are in the wrong position
3. The stubs of the 4th/5th mirror assembly are off the rails.

- Action -

Is each mirror positioned correctly on its scanner and on the 4th/5th mirror assembly?

Yes

No

Reposition the mirror correctly. If the spring plates are defective, replace them.

Are the stubs of the 4th/5th mirror assembly off the rails?

No

Yes

Put the mirror assembly stubs back on the rails.

Readjust the height of 4th/5th mirror assembly by turning the adjusting screw.

1.12 TONER DENSITY TOO HIGH

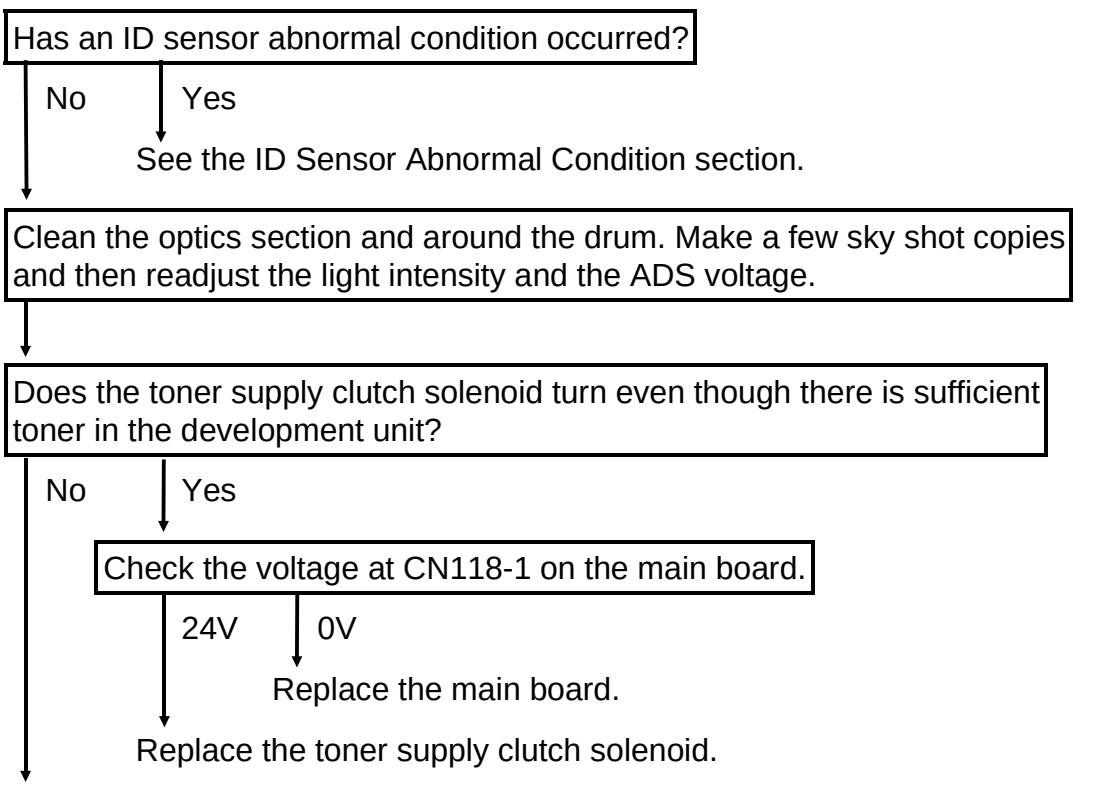
- Phenomenon -

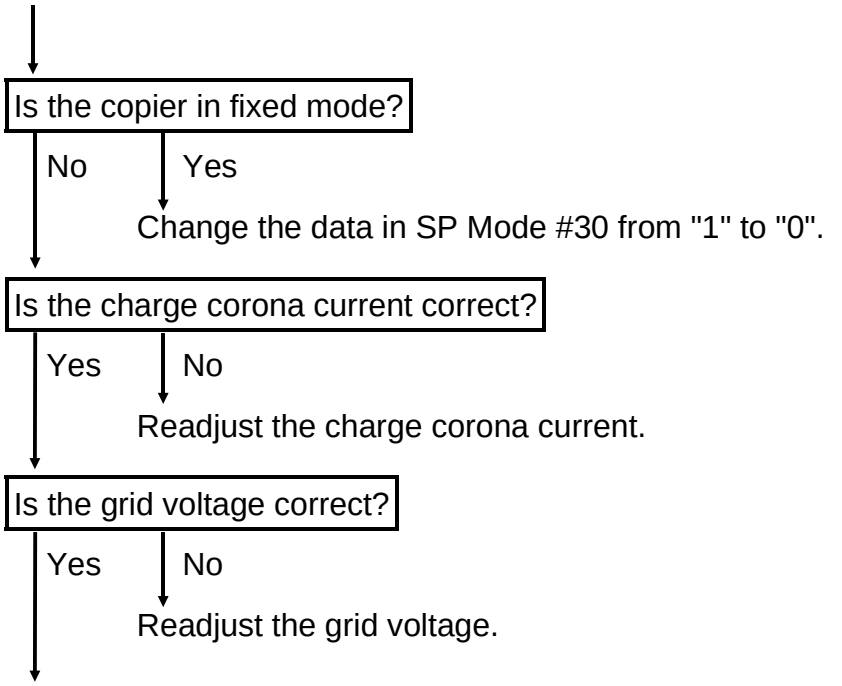
1. Dirty background appears on the copy.
2. The image density of black solid areas is too high.
3. Toner has built up on the endblock cover of the TC/SC corona unit and also on the upper cover of the development unit.

- Possible Causes -

1. Light intensity of the exposure lamp is too high.
2. Toner supply clutch keeps on turning continuously.
3. Copier is in fixed toner supply mode.
4. Main board defective
5. ID sensor bias voltage (modules) is too low.
6. Charge corona current is too low.
7. ID sensor grid voltage is too low.

- Action -


Has an ID sensor abnormal condition occurred?
No
Yes
See the ID Sensor Abnormal Condition section.
Clean the optics section and around the drum. Make a few sky shot copies and then readjust the light intensity and the ADS voltage.
Does the toner supply clutch solenoid turn even though there is sufficient toner in the development unit?
No
Yes
Check the voltage at CN118-1 on the main board.
24V
0V
Replace the main board.
Replace the toner supply clutch solenoid.



Check the data of SP Mode #33. If the data is greater than "2", readjust the data to "0".

1.13 TONER DENSITY TOO LOW

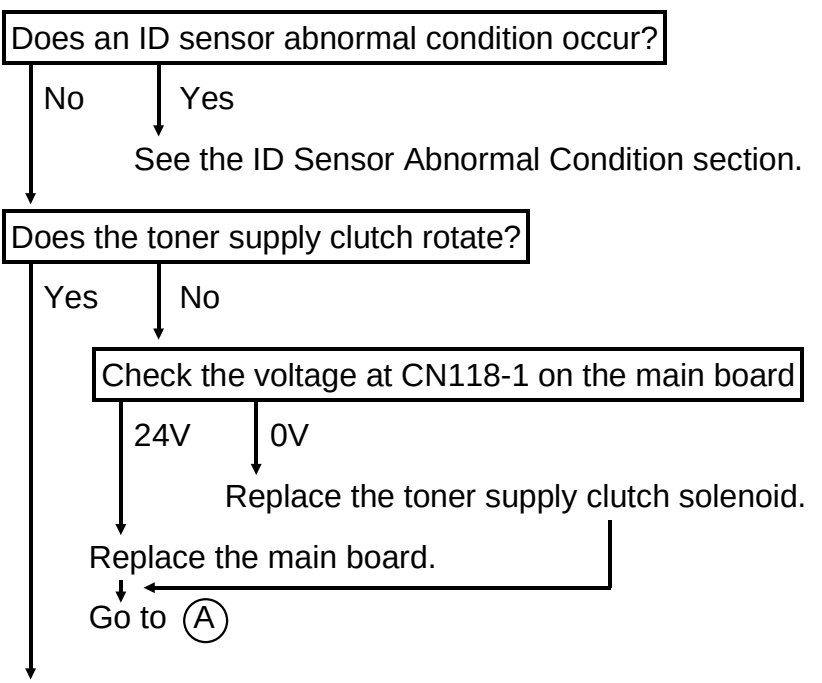
- Phenomenon -

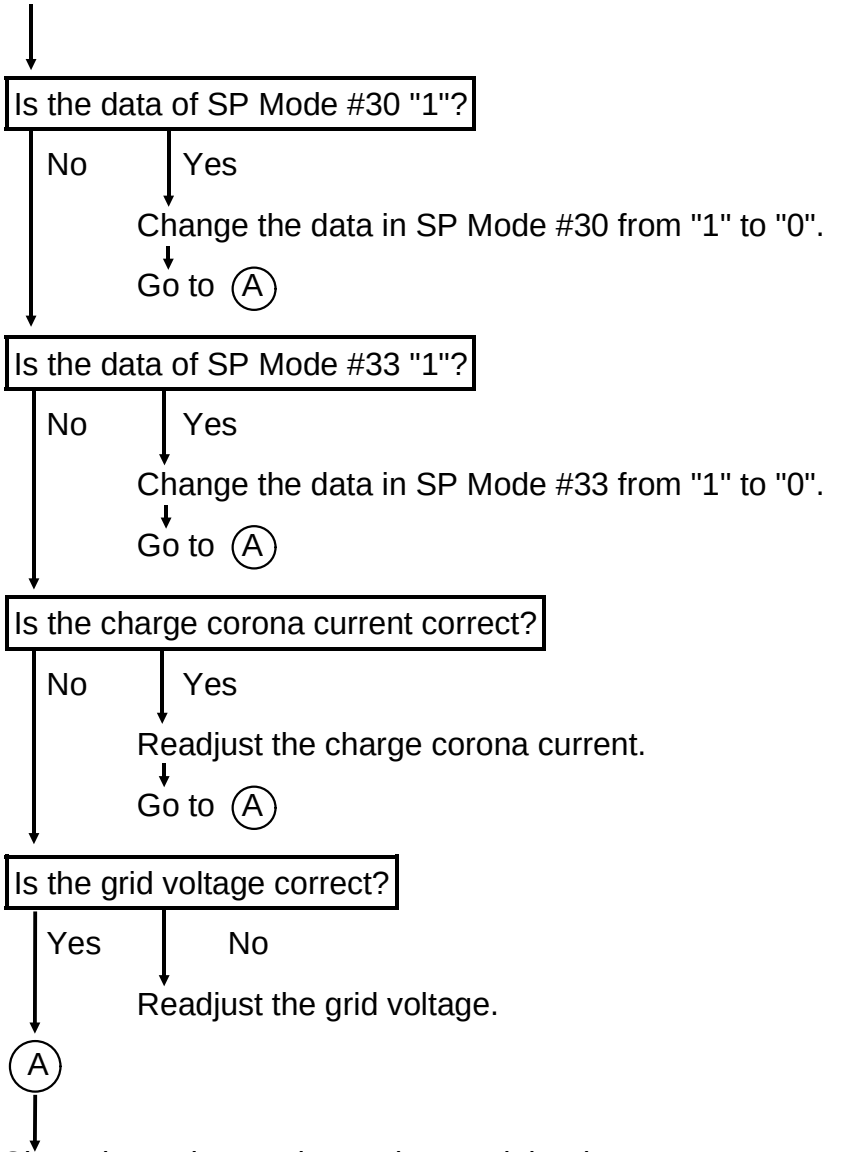
1. Light copy
2. Carrier is on the copy.
3. Light spots appear in black solid areas.

- Possible Causes -

1. Light intensity of the exposure lamp is too low.
2. Toner supply clutch does not rotate.
3. Copier is in the fixed toner supply mode.
4. Main board is defective.
5. ID sensor voltage is too high.
6. Charge corona current is too high.
7. ID sensor grid voltage is too high.

- Action -





Clean the optics section and around the drum.
Turn on DIP switch 101-1 on the main board. Place a few sheets of white paper on the exposure glass. Enter "99" using the numeral key and press the Start key to start free run. Repeat free run until Vsp becomes lower than 1/8 Vsg using SP mode #55.

Adjust the light intensity, ADS voltage, and/or Vsg voltage.

1.14 TONER SCATTERING

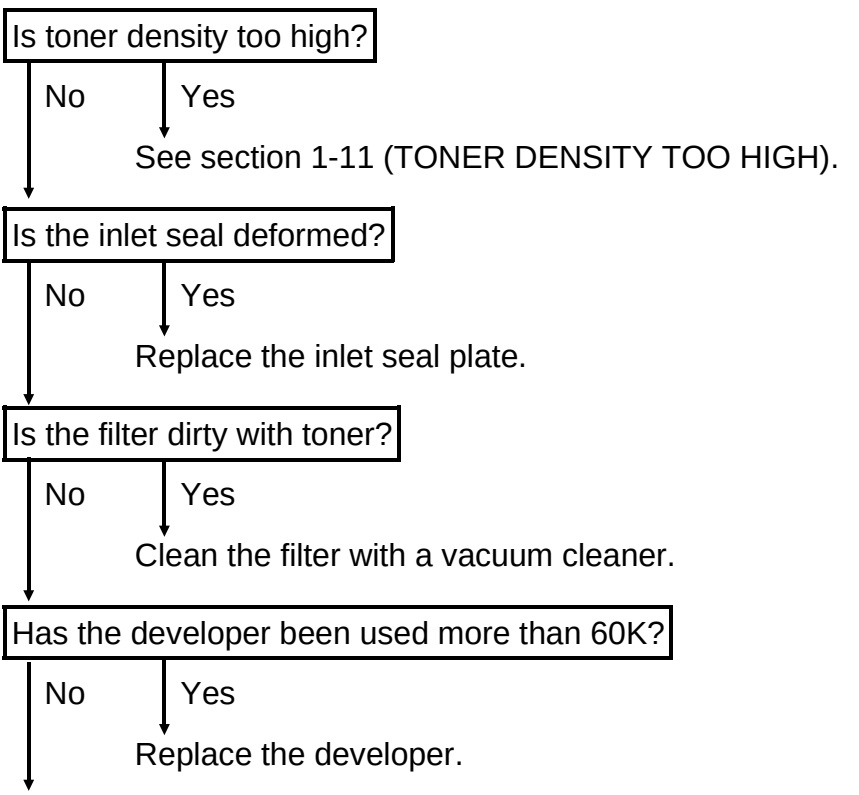
- Phenomenon -

Toner scatters from the development unit.

- Possible Causes -

1. Toner density is too high.
2. Inlet seal on the development unit is out of position.
3. Filter on the top of the development unit is dirty.
4. Developer deterioration
5. Doctor gap is too wide.

- Action -



Check the doctor gap. If the doctor gap is wider than the adjustment standard, adjust the doctor gap.

1.15 UNFUSED COPY IMAGE

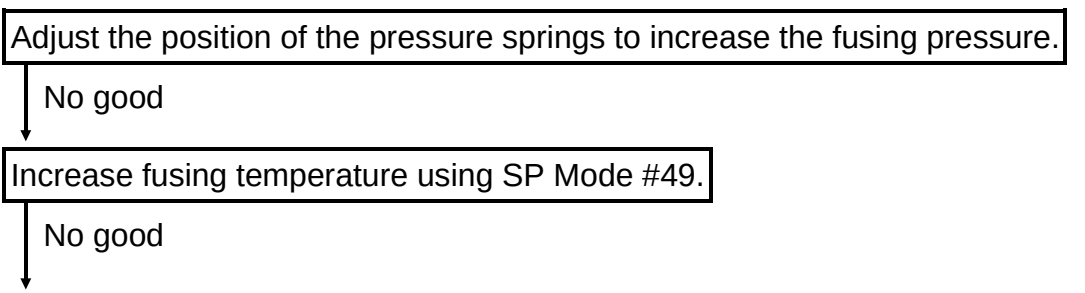
- Phenomenon -

Solid image rubs off easily.

- Possible Causes -

1. Fusing pressure is too weak.
2. Fusing temperature is too low.
3. Thermistor malfunction

- Action -


Adjust the position of the pressure springs to increase the fusing pressure.
No good
Increase fusing temperature using SP Mode #49.
No good

Check the thermistor. If the thermistor is malfunctioning, replace it.

1.16 PAPER MISFEED

- Phenomenon -

1. Misfeed location indicator turns on when the main switch is turned on even if there is no paper in the copier.
2. Misfeed location indicator always turns on at the same location when copies are made.

- Possible Causes -

1. Sensor is defective.
2. Mechanical and/or electrical malfunction

- Action 1 (Initial Misfeed) -

Check which sensor is defective using the Initial Misfeed Table. (See page 4-33.) Replace the defective sensor. If no sensors are defective, replace the main board.

- Action 2 (Misfeed during copy cycle) -

Set jam Detection OFF mode (SP mode #6) to on and make a copy to see whether a misfeed occurs.

Misfeed

No misfeed

Check which sensor is defective using the Misfeed During Copy Cycle table. (See page 4-33.) If no sensors are not defective, replace the main board.

Check whether a mechanical or electrical malfunction occurs. Replace the defective parts.

1.17 DF ORIGINAL MISFEED OR SKEW

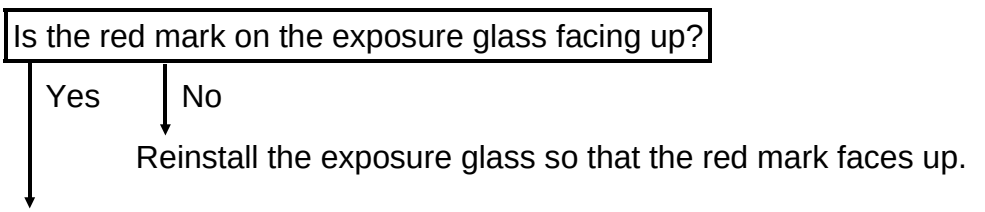
- Phenomenon -

When the DF is in use, the original stops on the exposure glass or is skewed even if the electrical components are functioning normally.

- Possible Causes -

1. Exposure glass is upside-down.
2. Friction between the exposure glass and the feed belt

- Action -



Clean the exposure glass surface with alcohol or water. Pour a small amount of silicone oil on the exposure glass and wipe the exposure glass with a dry cloth to reduce the friction between the exposure glass and the feed belt.

2. SERVICE CALL CONDITION

2.1 CODE #11 — EXPOSURE LAMP ERROR

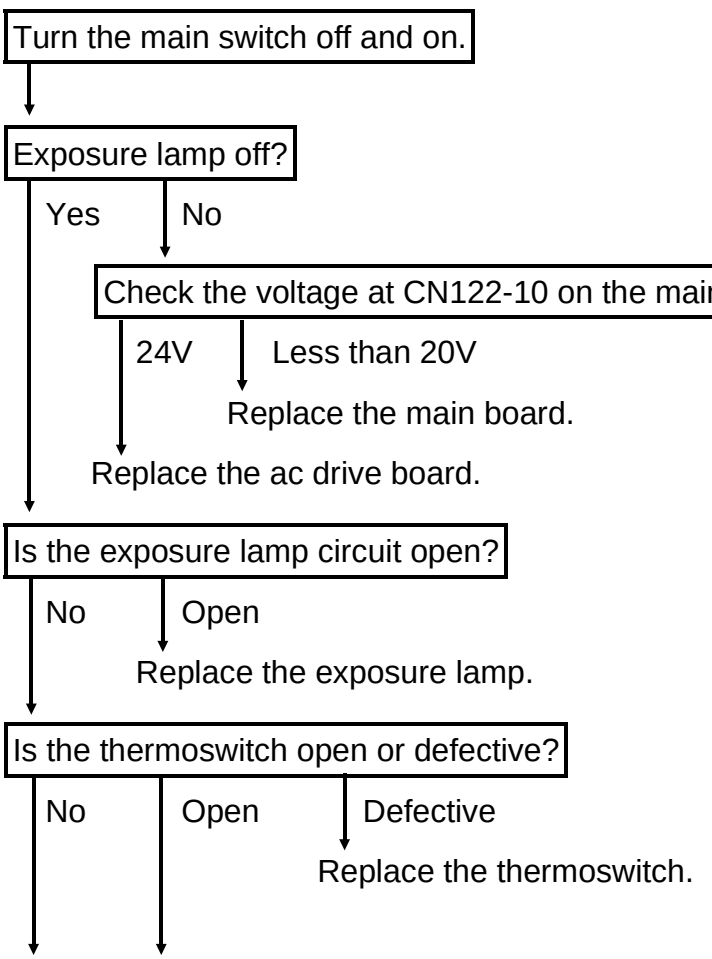
- Definition -

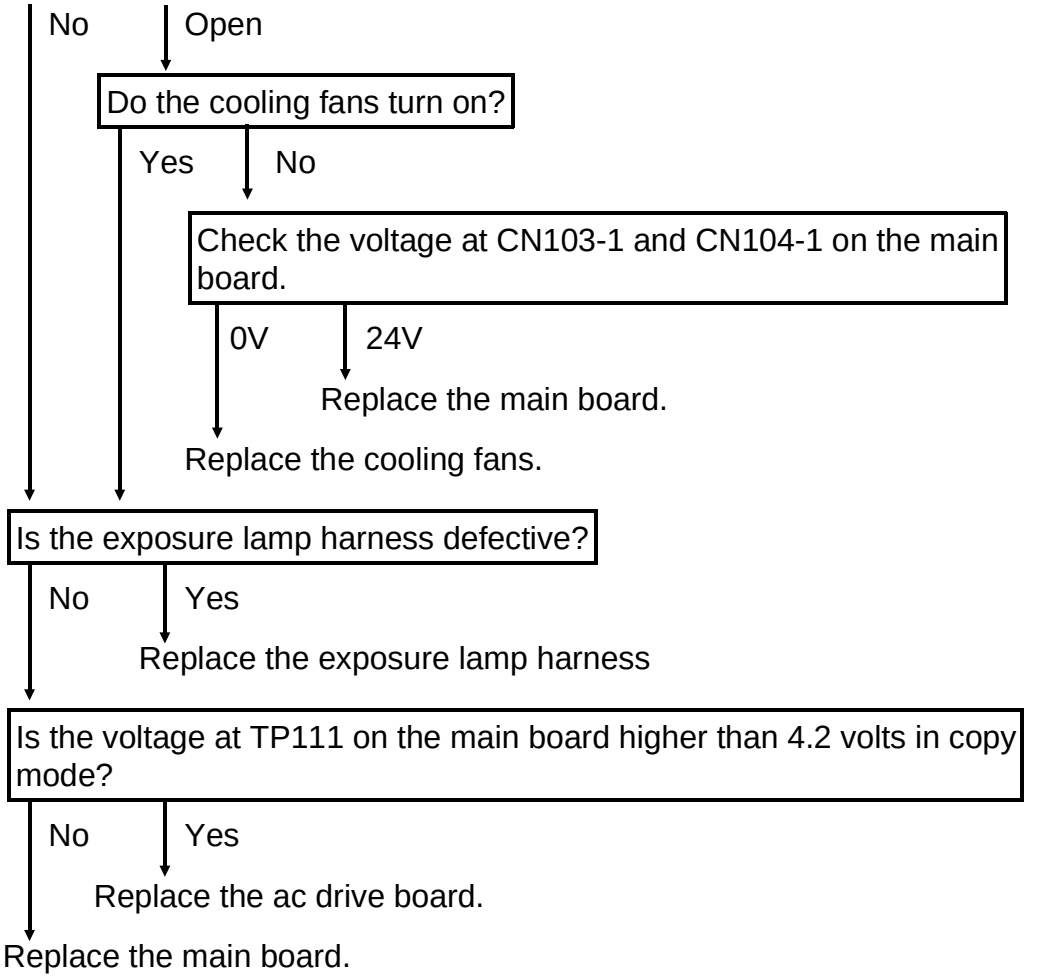
- The feedback signal becomes higher than 4.2 volts (r.m.s.) for 1.0 second when the exposure lamp is on.
- The feedback signal becomes higher than 1.0 volt (r.m.s.) for 1.0 second when the exposure lamp is off.

- Possible Causes -

- Exposure lamp open
- Thermoswitch open
- AC drive board defective
- Main board defective
- DC harness defective

- Action -




No
Open
Do the cooling fans turn on?
Yes
No
Check the voltage at CN103-1 and CN104-1 on the main board.
0V
24V
Replace the main board.
Replace the cooling fans.
Is the exposure lamp harness defective?
No
Yes
Replace the exposure lamp harness
Is the voltage at TP111 on the main board higher than 4.2 volts in copy mode?
No
Yes
Replace the ac drive board.
Replace the main board.

2.2 CODE #12 — EXPOSURE LAMP ERROR

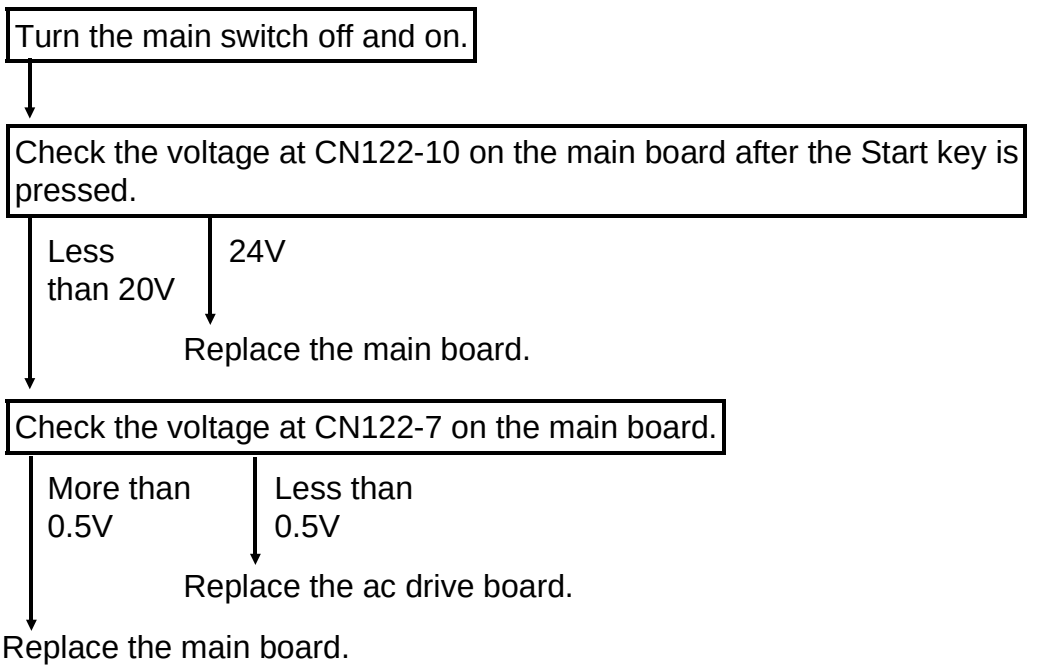
- Definition -

- The feedback signal falls below 0.5 volt (r.m.s.) for 1.0 second when the exposure lamp is on.
- The exposure stays on for longer than 10 seconds.

- Possible Causes -

- AC drive board defective
- Main board defective
- DC harness defective

- Action -


Turn the main switch off and on.
Check the voltage at CN122-10 on the main board after the Start key is pressed.
Less than 20V
24V
Replace the main board.
Check the voltage at CN122-7 on the main board.
More than 0.5V
Less than 0.5V
Replace the ac drive board.
Replace the main board.

2.3 CODE #13 — ZERO CROSS SIGNAL ERROR

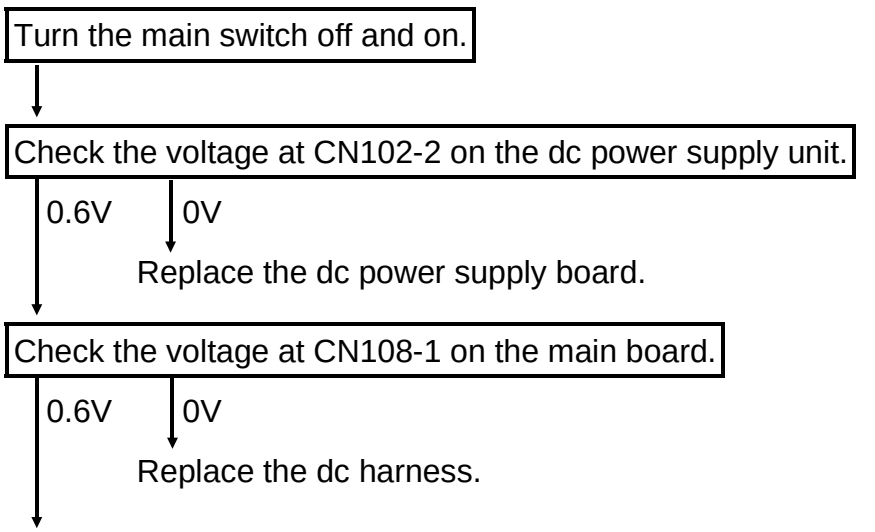
- Definition -

The CPU does not receive the zero cross signal within 0.56 second.

- Possible Causes -

- Main board defective
- DC power supply board
- Zero cross line open

- Action -


Turn the main switch off and on.
Check the voltage at CN102-2 on the dc power supply unit.
0.6V
0V
Replace the dc power supply board.
Check the voltage at CN108-1 on the main board.
0.6V
0V
Replace the dc harness.
Replace the main board.

2.4 CODE #21 — SCANNER HOME POSITION ERROR

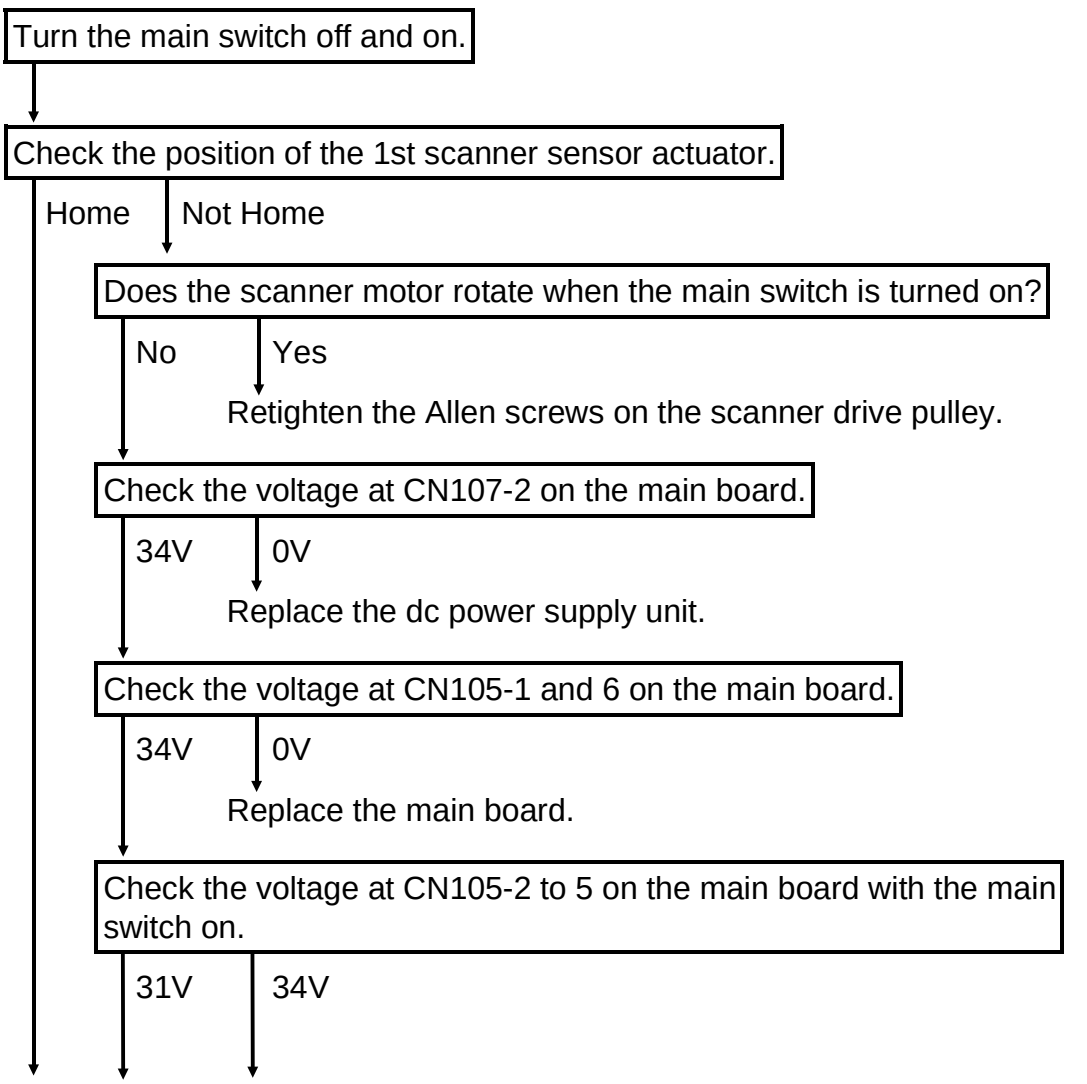
- Definition -

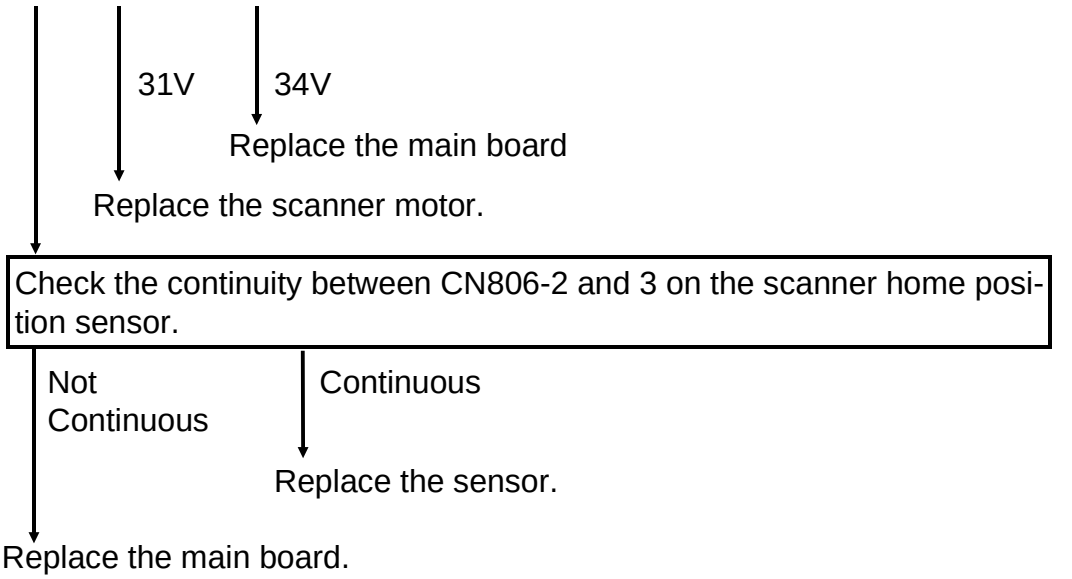
The scanner home position sensor remains off (LOW) 8 seconds after the main switch is turned on.

- Possible Causes -

- Scanner home position sensor short
- Scanner motor defect
- Main board defect
- DC power supply unit defect

- Action -


Turn the main switch off and on.
Check the position of the 1st scanner sensor actuator.
Home
Not Home
Does the scanner motor rotate when the main switch is turned on?
No
Yes
Retighten the Allen screws on the scanner drive pulley.
Check the voltage at CN107-2 on the main board.
34V
0V
Replace the dc power supply unit.
Check the voltage at CN105-1 and 6 on the main board.
34V
0V
Replace the main board.
Check the voltage at CN105-2 to 5 on the main board with the main switch on.
31V
34V


31V
34V
Replace the main board
Replace the scanner motor.
Check the continuity between CN806-2 and 3 on the scanner home position sensor.
Not Continuous
Continuous
Replace the sensor.
Replace the main board.

2.5 CODE #22 — SCANNER HOME POSITION ERROR

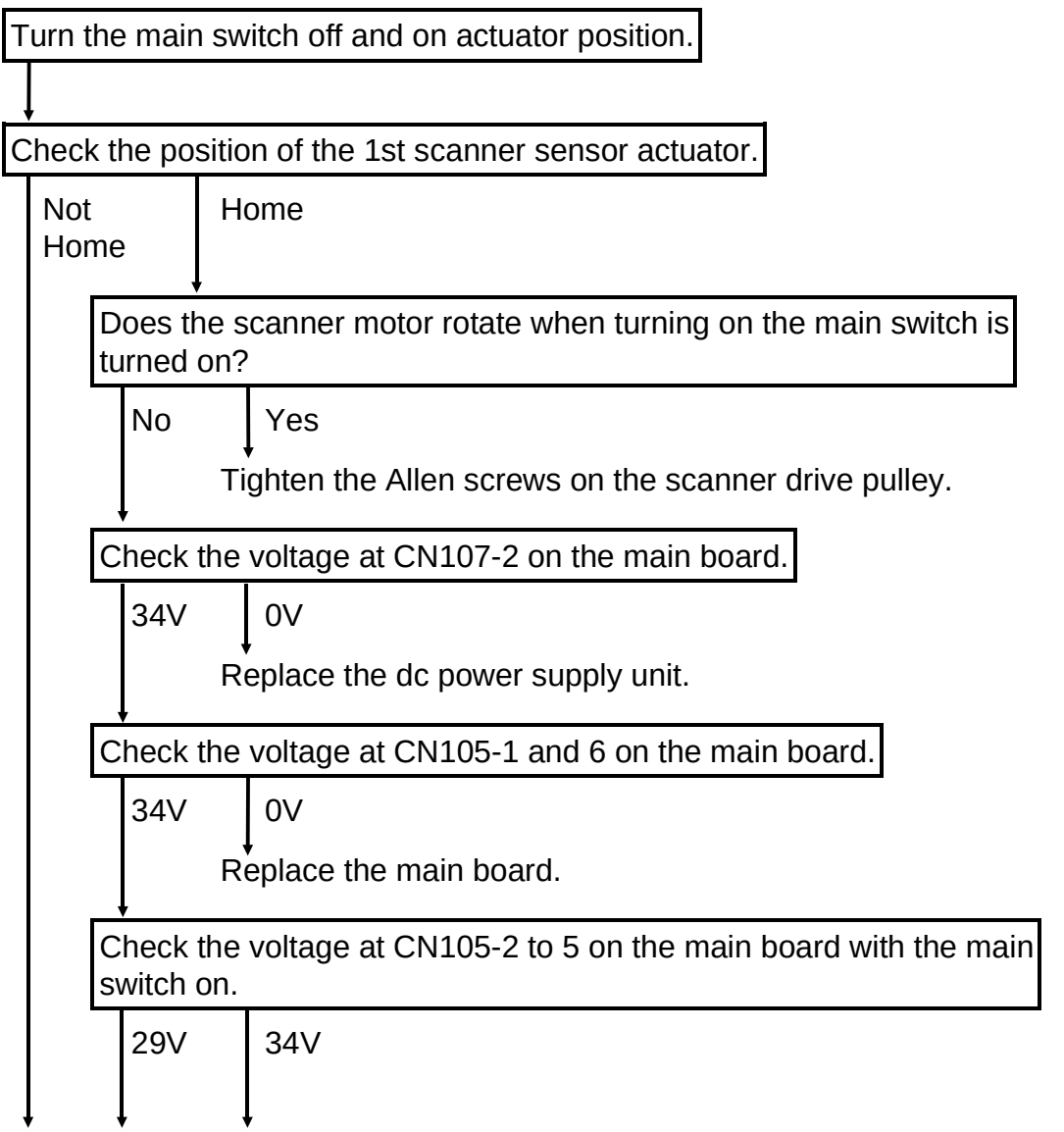
- Definition -

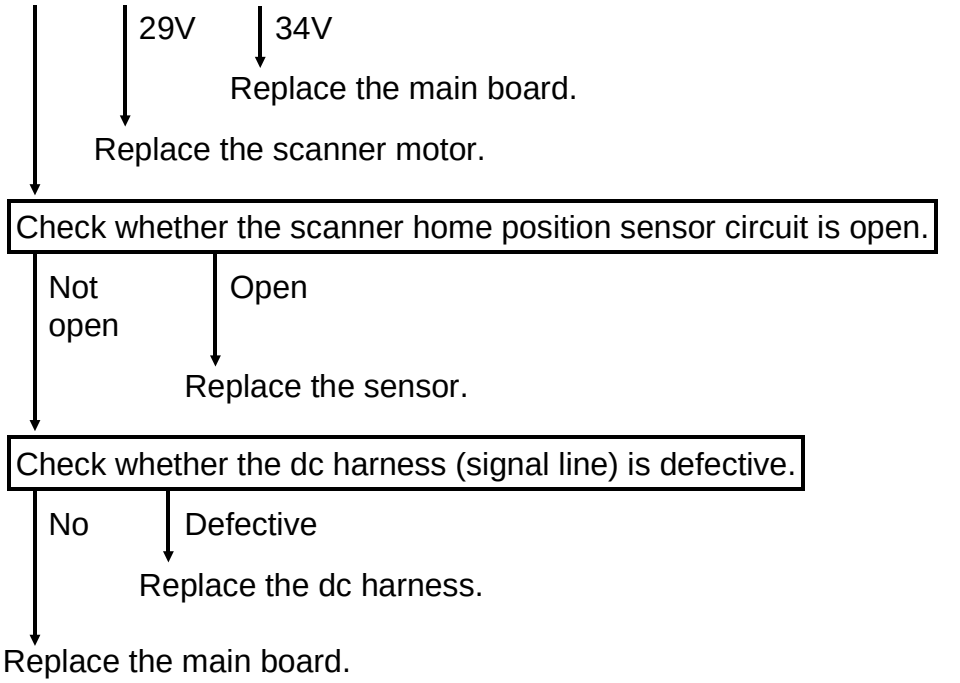
The scanner home position sensor remains on (HIGH) 1.0 second after the scanner starts.

- Possible Causes -

- Scanner home position sensor circuit open
- Scanner motor defective
- Main Motor defective
- DC power supply unit defective

- Action -


Turn the main switch off and on actuator position.
Check the position of the 1st scanner sensor actuator.
Not Home
Home
Does the scanner motor rotate when turning on the main switch is turned on?
No
Yes
Tighten the Allen screws on the scanner drive pulley.
Check the voltage at CN107-2 on the main board.
34V
0V
Replace the dc power supply unit.
Check the voltage at CN105-1 and 6 on the main board.
34V
0V
Replace the main board.
Check the voltage at CN105-2 to 5 on the main board with the main switch on.
29V
34V


29V
34V
Replace the main board.
Replace the scanner motor.
Check whether the scanner home position sensor circuit is open.
Not open
Open
Replace the sensor.
Check whether the dc harness (signal line) is defective.
No
Defective
Replace the dc harness.
Replace the main board.

2.6 CODE #28 — LENS HOME POSITION ERROR

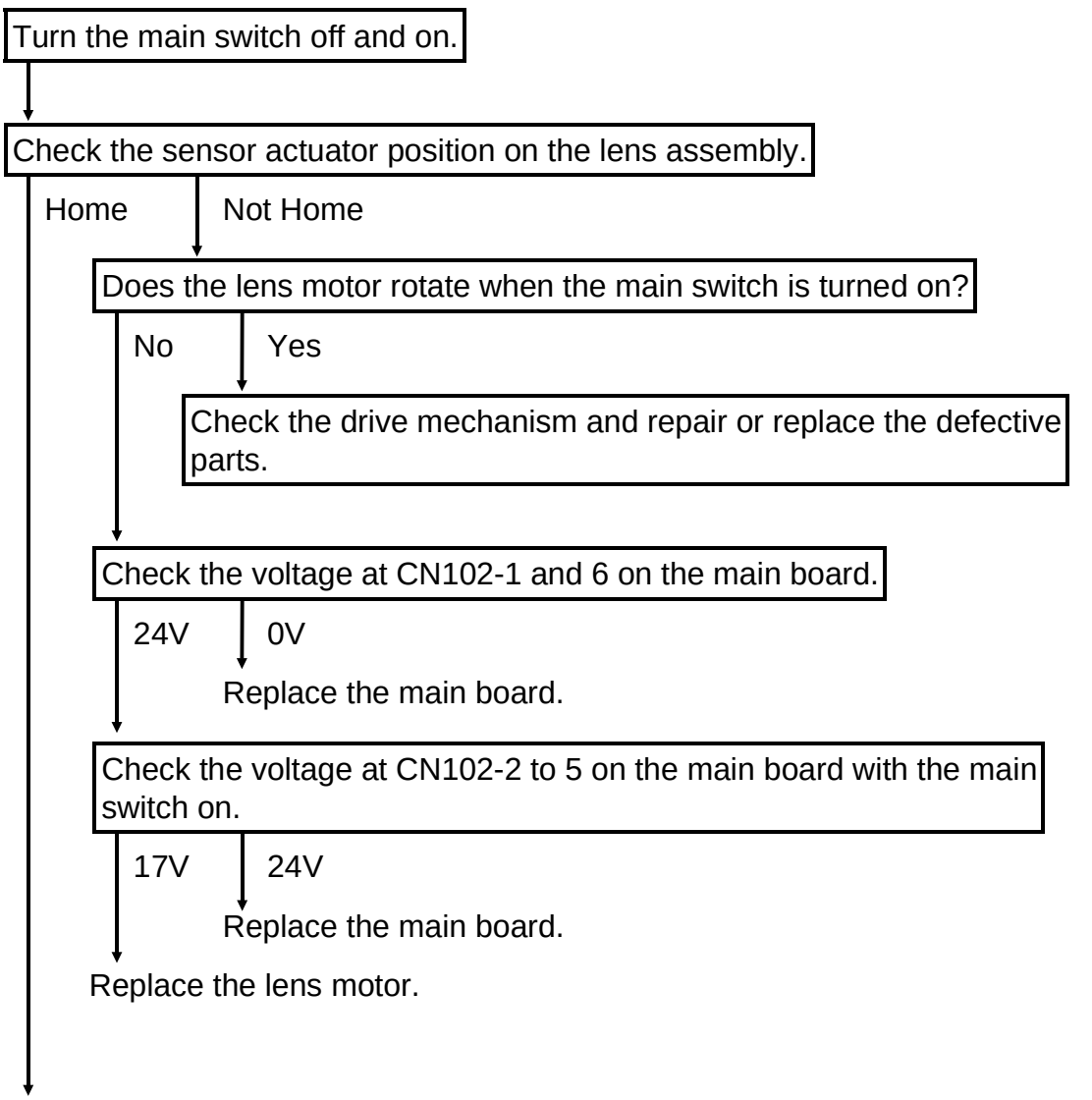
- Definition -

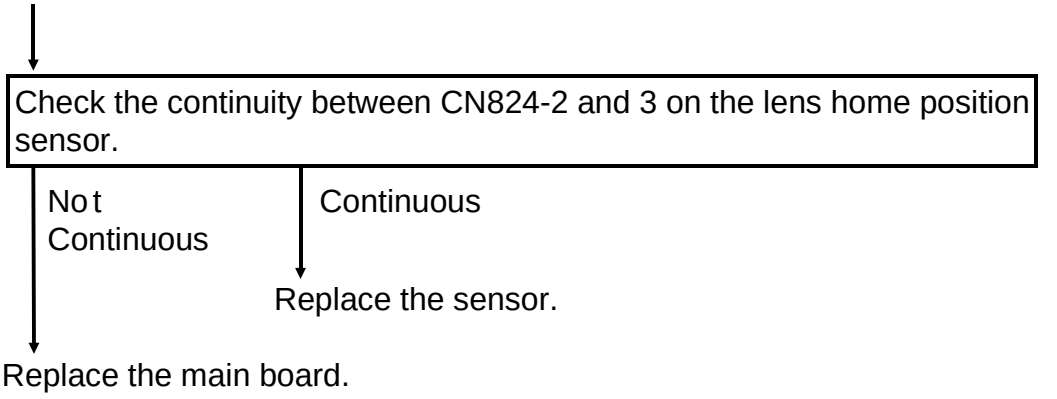
The lens home position sensor remains off (LOW) 3.5 seconds after the lens moves to the home position.

- Possible Causes -

- Lens home position sensor short
- Lens drive motor defect
- Main board defect

- Action -


Turn the main switch off and on.
Check the sensor actuator position on the lens assembly.
Home
Not Home
Does the lens motor rotate when the main switch is turned on?
No
Yes
Check the drive mechanism and repair or replace the defective parts.
Check the voltage at CN102-1 and 6 on the main board.
24V
0V
Replace the main board.
Check the voltage at CN102-2 to 5 on the main board with the main switch on.
17V
24V
Replace the main board.
Replace the lens motor.


Check the continuity between CN824-2 and 3 on the lens home position sensor.
Not Continuous
Continuous
Replace the sensor.
Replace the main board.

2.7 CODE #29 — LENS HOME POSITION ERROR

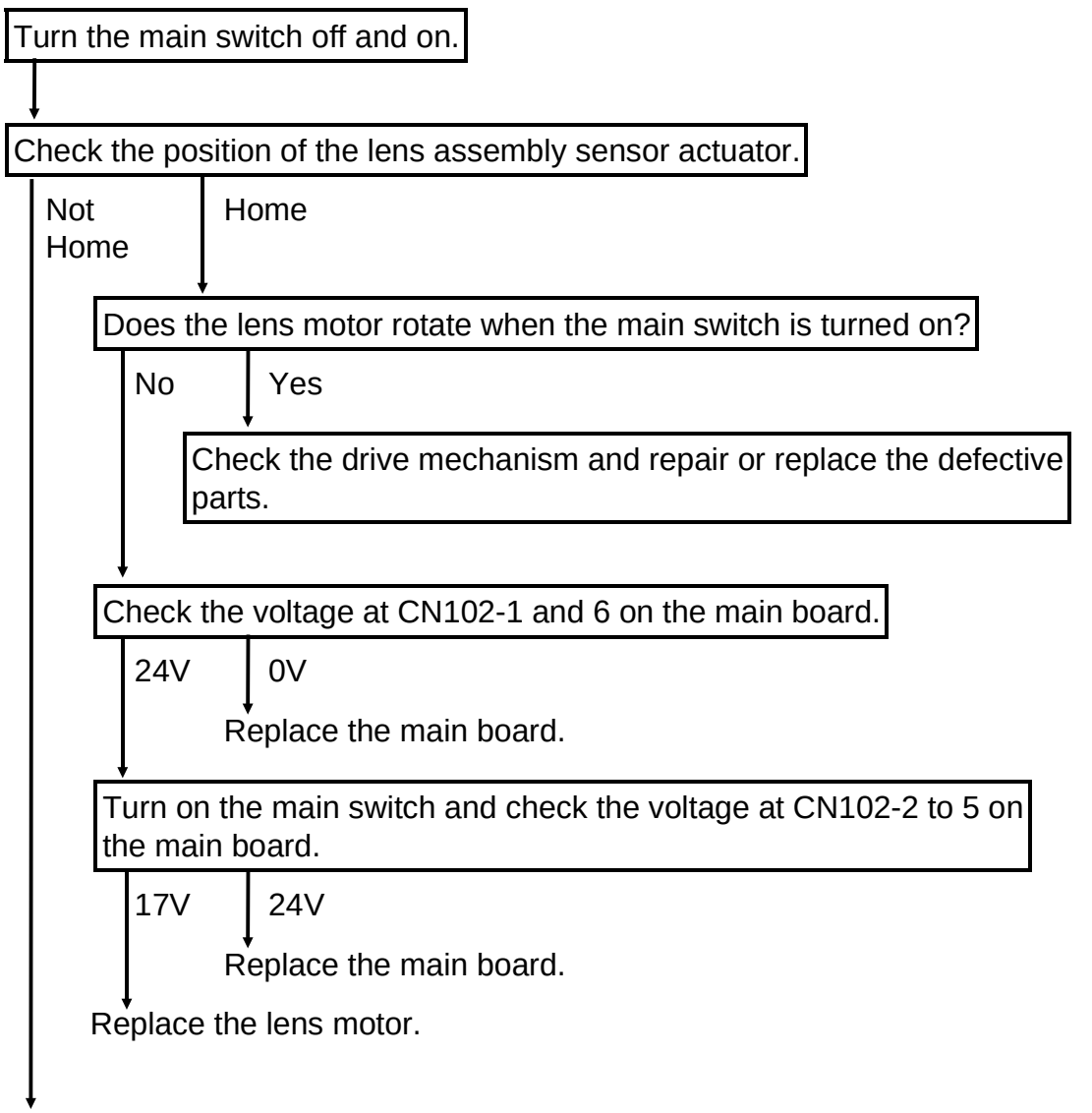
- Definition -

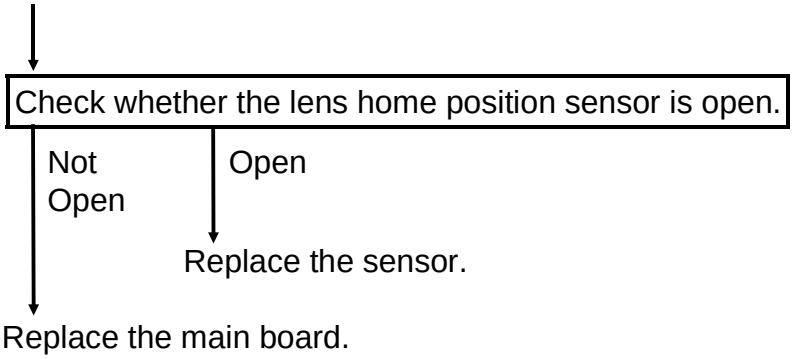
The lens home position sensor is still on (HIGH) 3.5 seconds after the lens leaves the home position.

- Possible Causes -

- Lens home position sensor open
- Lens drive motor defective
- Main board defective

- Action -


Turn the main switch off and on.
Check the position of the lens assembly sensor actuator.
Not Home
Home
Does the lens motor rotate when the main switch is turned on?
No
Yes
Check the drive mechanism and repair or replace the defective parts.
Check the voltage at CN102-1 and 6 on the main board.
24V
0V
Replace the main board.
Turn on the main switch and check the voltage at CN102-2 to 5 on the main board.
17V
24V
Replace the main board.
Replace the lens motor.


Check whether the lens home position sensor is open.
Not Open
Open
Replace the sensor.
Replace the main board.

2.8 CODE #2A — 4TH/5TH MIRROR HOME POSITION ERROR

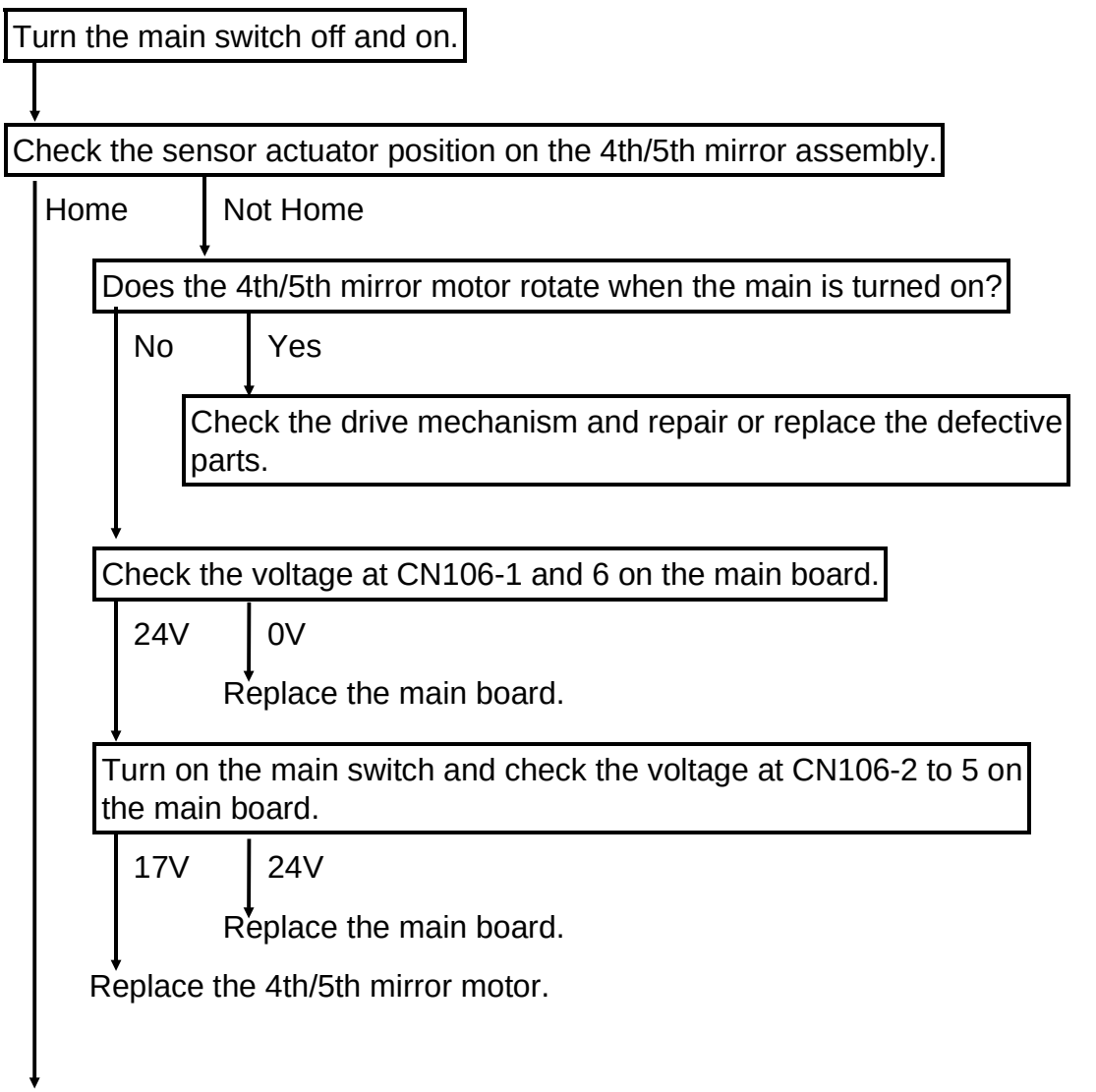
- Definition -

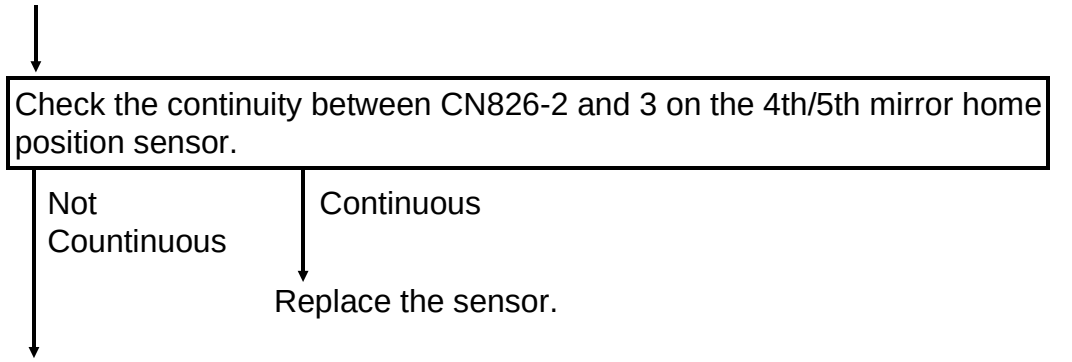
The 4th/5th mirror home position sensor is still off (LOW) 2.5 seconds after the 4th/5th mirror assembly moves to the home position.

- Possible Causes -

- 4th/5th mirror home position sensor short
- 4th/5th mirror motor defect
- Main board defect

- Action -


Turn the main switch off and on.
Check the sensor actuator position on the 4th/5th mirror assembly.
Home
Not Home
Does the 4th/5th mirror motor rotate when the main is turned on?
No
Yes
Check the drive mechanism and repair or replace the defective parts.
Check the voltage at CN106-1 and 6 on the main board.
24V
0V
Replace the main board.
Turn on the main switch and check the voltage at CN106-2 to 5 on the main board.
17V
24V
Replace the main board.
Replace the 4th/5th mirror motor.


Check the continuity between CN826-2 and 3 on the 4th/5th mirror home position sensor.
Not Countinuous
Continuous
Replace the sensor.
Replace the main board.

2.9 CODE #2B — 4TH/5TH MIRROR HOME POSITION ERROR

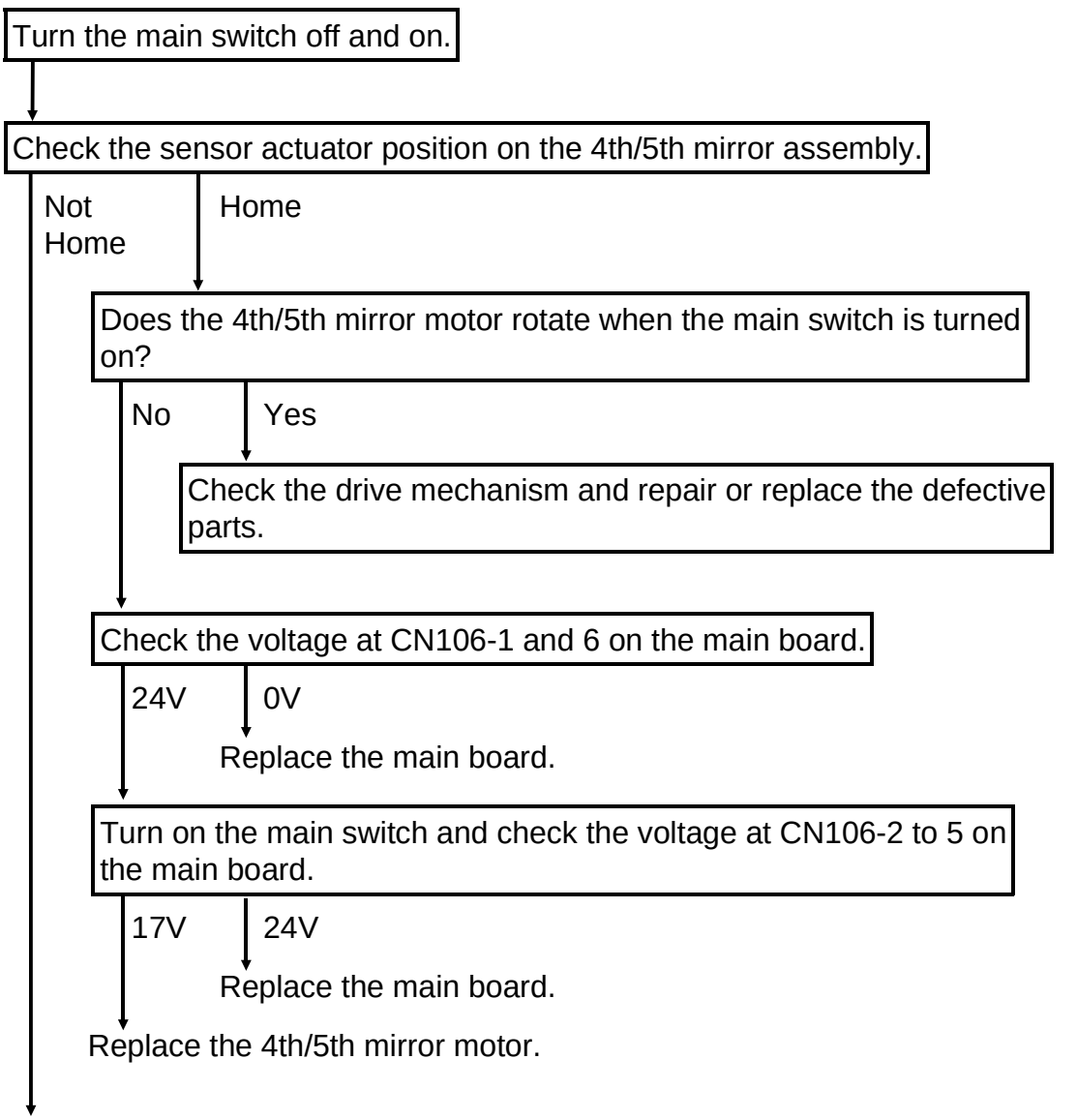
- Definition -

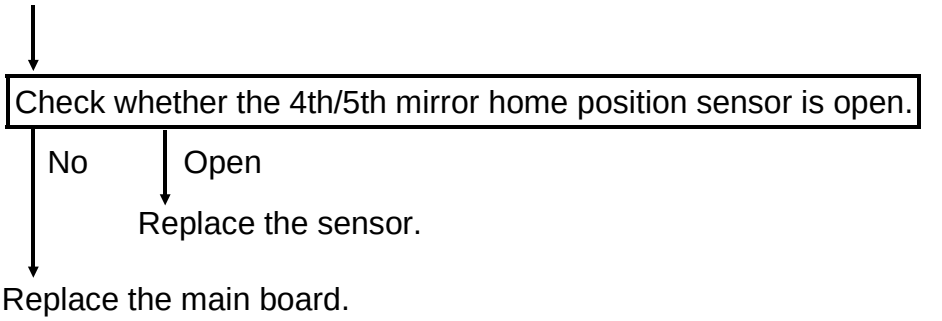
The 4th/5th mirror home position sensor is still on (HIGH) 2.5 seconds after the 4th/5th mirror assembly leaves the home position.

- Possible Causes -

- 4th/5th mirror home position sensor open
- 4th/5th mirror motor defective
- Main board defective

- Action -


Turn the main switch off and on.
Check the sensor actuator position on the 4th/5th mirror assembly.
Not Home
Home
Does the 4th/5th mirror motor rotate when the main switch is turned on?
No
Yes
Check the drive mechanism and repair or replace the defective parts.
Check the voltage at CN106-1 and 6 on the main board.
24V
0V
Replace the main board.
Turn on the main switch and check the voltage at CN106-2 to 5 on the main board.
17V
24V
Replace the main board.
Replace the 4th/5th mirror motor.


Check whether the 4th/5th mirror home position sensor is open.
No
Open
Replace the sensor.
Replace the main board.

2.10 CODE #52 — FUSING WARM-UP ERROR

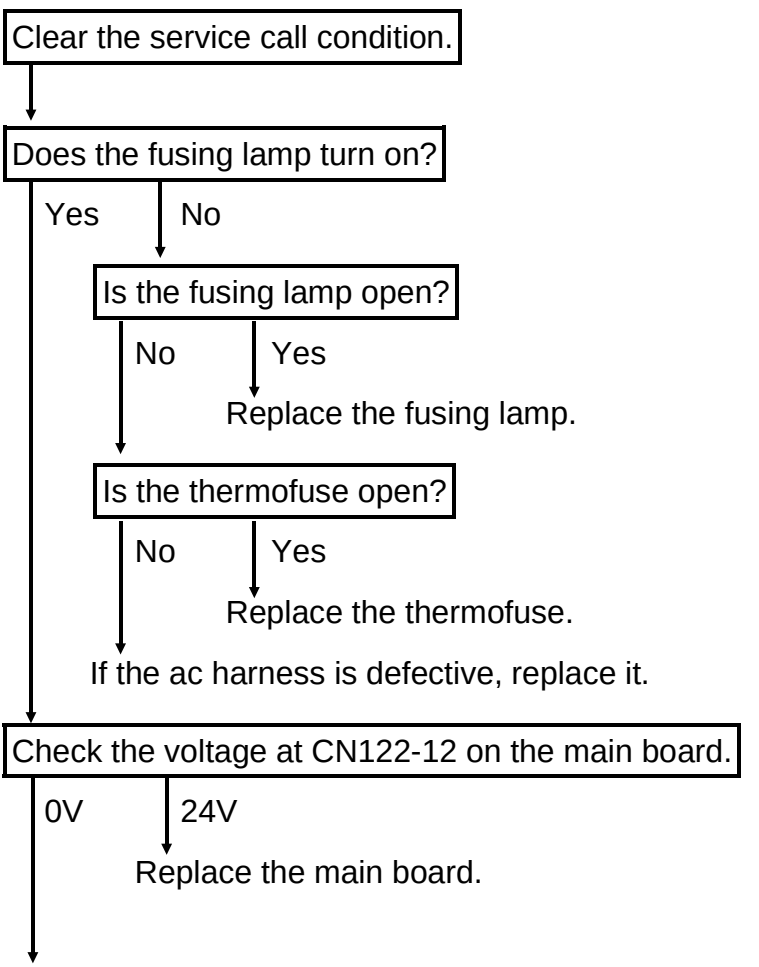
- Definition -

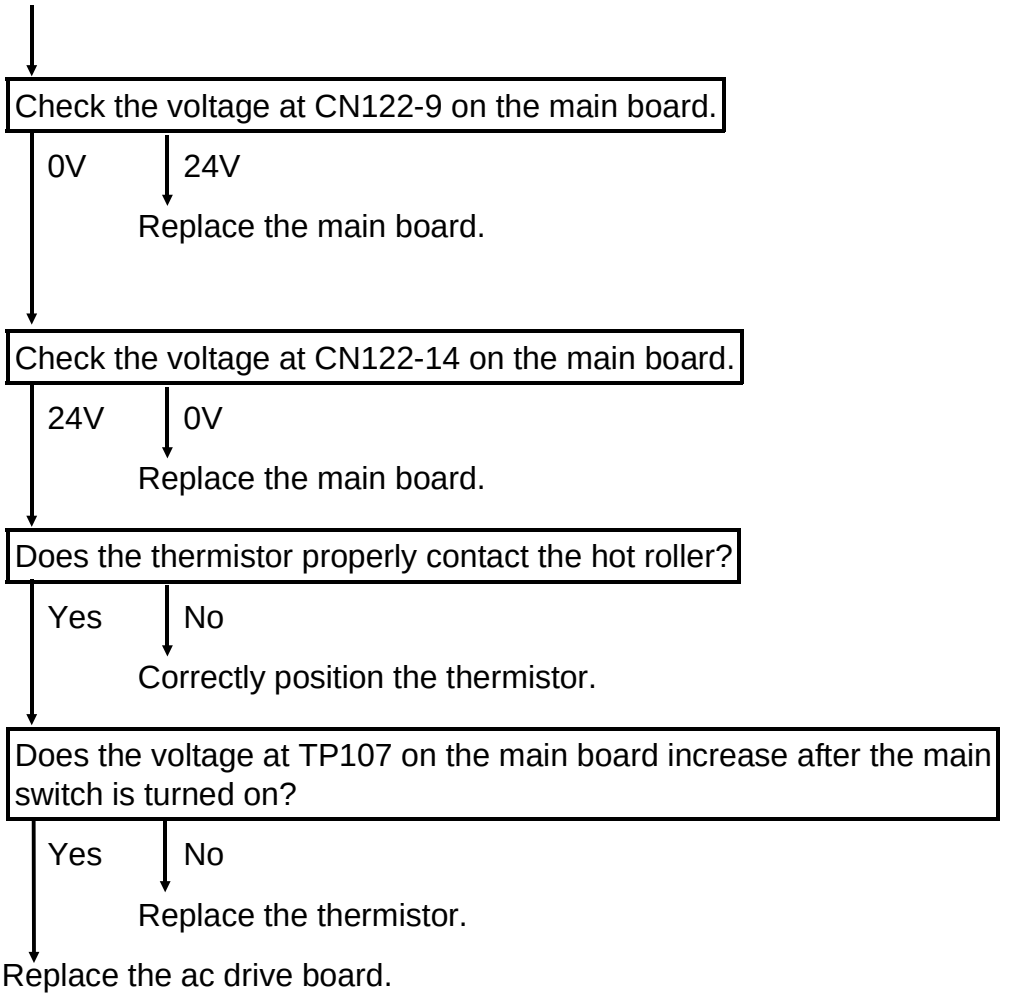
The temperature detected by the thermistor does not reach 175°C within 100 seconds after the main switch is turned on.

- Possible Causes -

- Thermistor position error
- Fusing lamp open
- Thermofuse open
- AC drive board defective
- Main board defective

- Action -




Check the voltage at CN122-9 on the main board.
0V
24V
Replace the main board.
Check the voltage at CN122-14 on the main board.
24V
0V
Replace the main board.
Does the thermistor properly contact the hot roller?
Yes
No
Correctly position the thermistor.
Does the voltage at TP107 on the main board increase after the main switch is turned on?
Yes
No
Replace the thermistor.
Replace the ac drive board.

2.11 CODE #53 — FUSING OVERHEAT

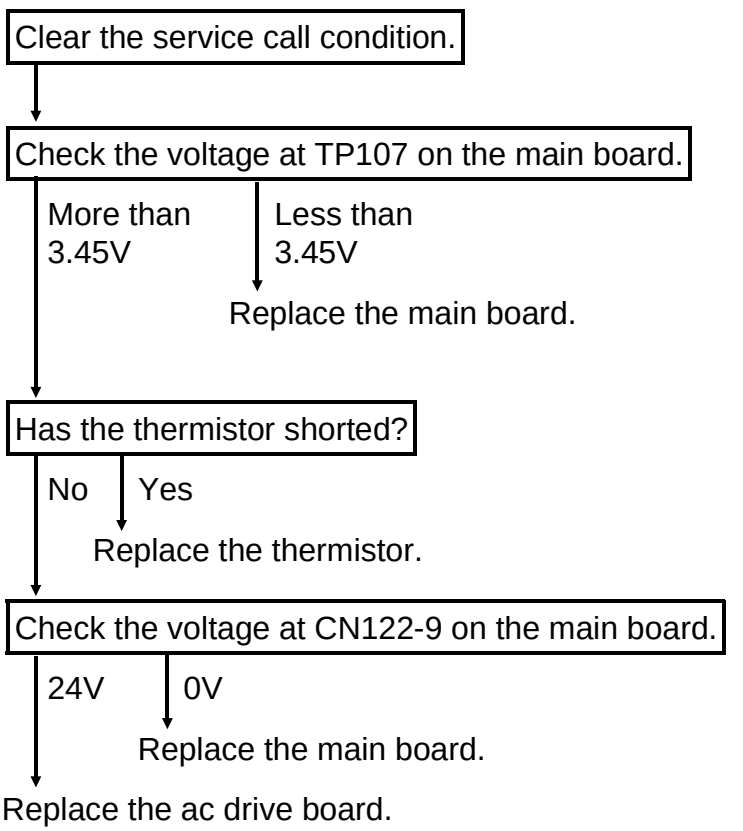
- Definition -

The thermistor detects a temperature higher than 240°C.

- Possible Causes -

- Thermistor short
- AC drive board defect
- Main board defect

- Action -



2.12 CODE #55 — FUSING THERMISTOR OPEN

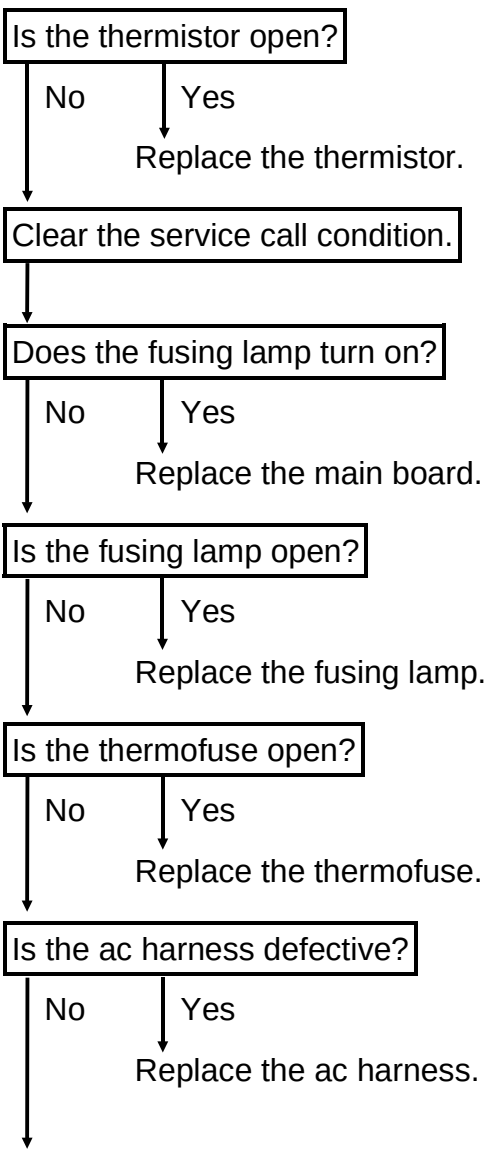
- Definition -

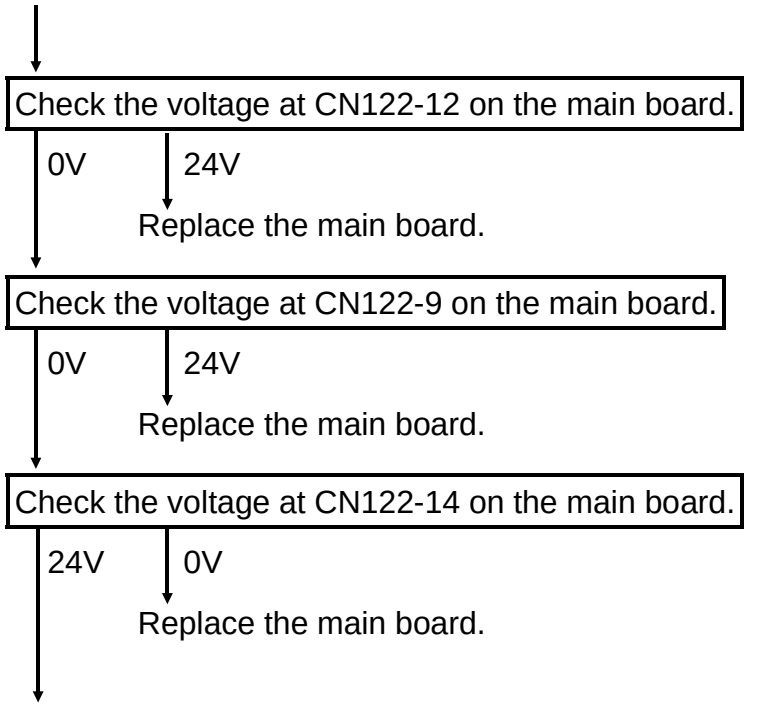
The thermistor does not detect 2°C within 30 seconds after the main switch is turned on.

- Possible Causes -

- Thermistor open
- Main board defective
- Fusing lamp open
- Thermofuse open

- Action -




Check the voltage at CN122-12 on the main board.
0V
24V
Replace the main board.
Check the voltage at CN122-9 on the main board.
0V
24V
Replace the main board.
Check the voltage at CN122-14 on the main board.
24V
0V
Replace the main board.
Replace the ac drive board.

2.13 E70 (IN THE MAGNIFICATION INDICATOR) — TONER OVERFLOW SENSOR ON

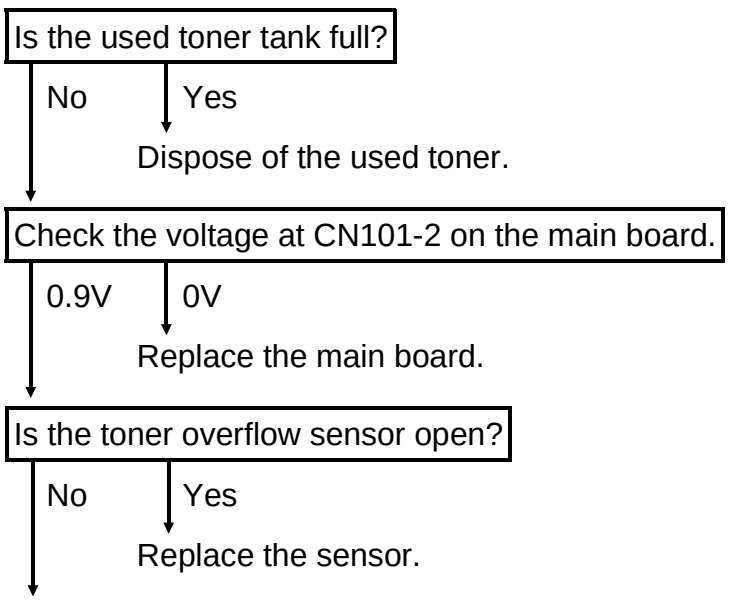
- Definition -

Toner overflow sensor turns on

- Possible Causes -

- Toner overflow
- Toner overflow sensor open
- Main board defective

- Action -



Replace the main board.

2.14 CODE #80 — DUPLEX AND COPIER BOARD COMMUNICATION ERROR

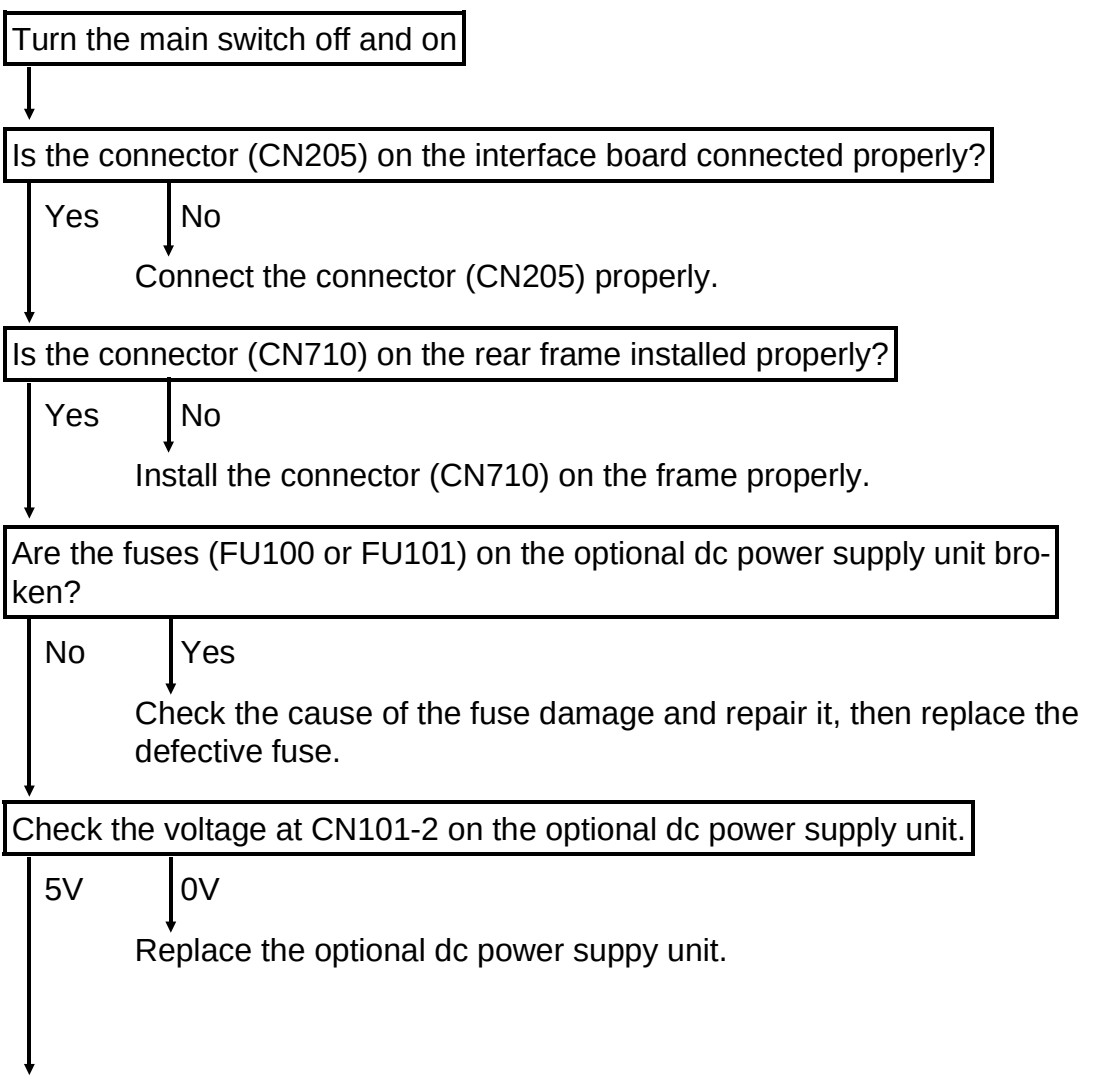
- Definition -

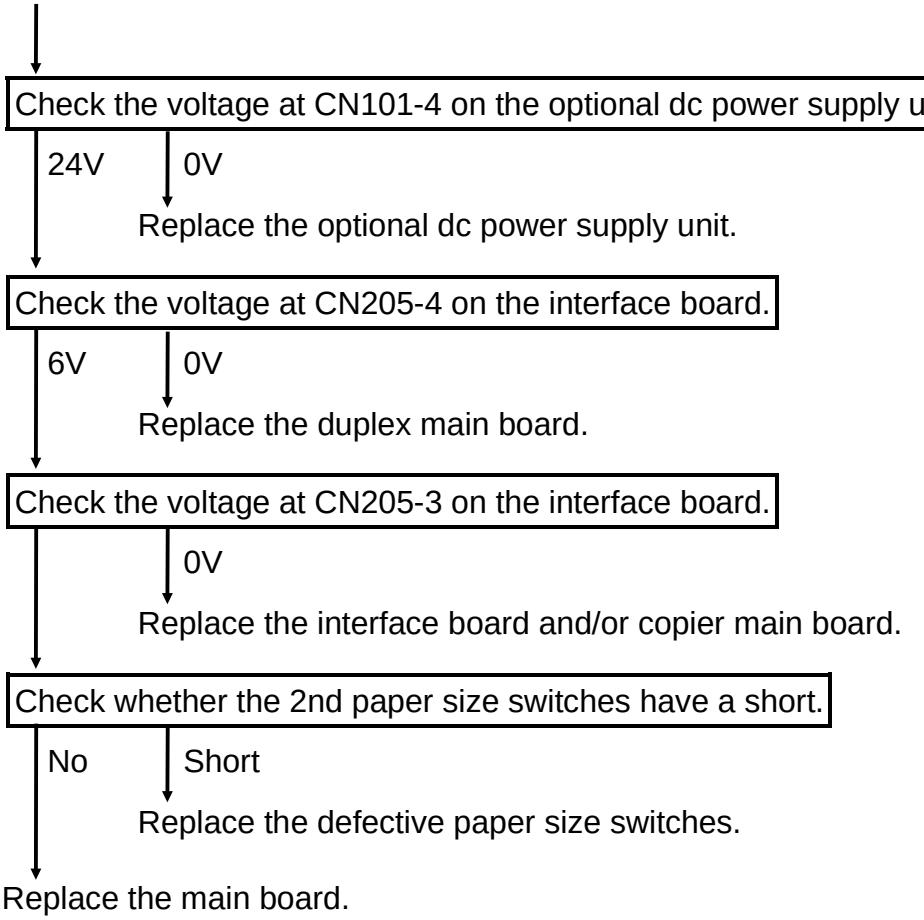
The copier main board does not receive any signal from the duplex main board.

- Possible Causes -

- Interface board defective
- Copier main board defective
- Duplex main board defective
- Optional dc power supply unit defective
- 2nd paper size switches shorted

- Action -


Turn the main switch off and on
Is the connector (CN205) on the interface board connected properly?
Yes
No
Connect the connector (CN205) properly.
Is the connector (CN710) on the rear frame installed properly?
Yes
No
Install the connector (CN710) on the frame properly.
Are the fuses (FU100 or FU101) on the optional dc power supply unit broken?
No
Yes
Check the cause of the fuse damage and repair it, then replace the defective fuse.
Check the voltage at CN101-2 on the optional dc power supply unit.
5V
0V
Replace the optional dc power suppy unit.


Check the voltage at CN101-4 on the optional dc power supply unit.
24V
0V
Replace the optional dc power supply unit.
Check the voltage at CN205-4 on the interface board.
6V
0V
Replace the duplex main board.
Check the voltage at CN205-3 on the interface board.
0V
Replace the interface board and/or copier main board.
Check whether the 2nd paper size switches have a short.
No
Short
Replace the defective paper size switches.
Replace the main board.

2.15 CODE #81 — INTERFACE BOARD ERROR

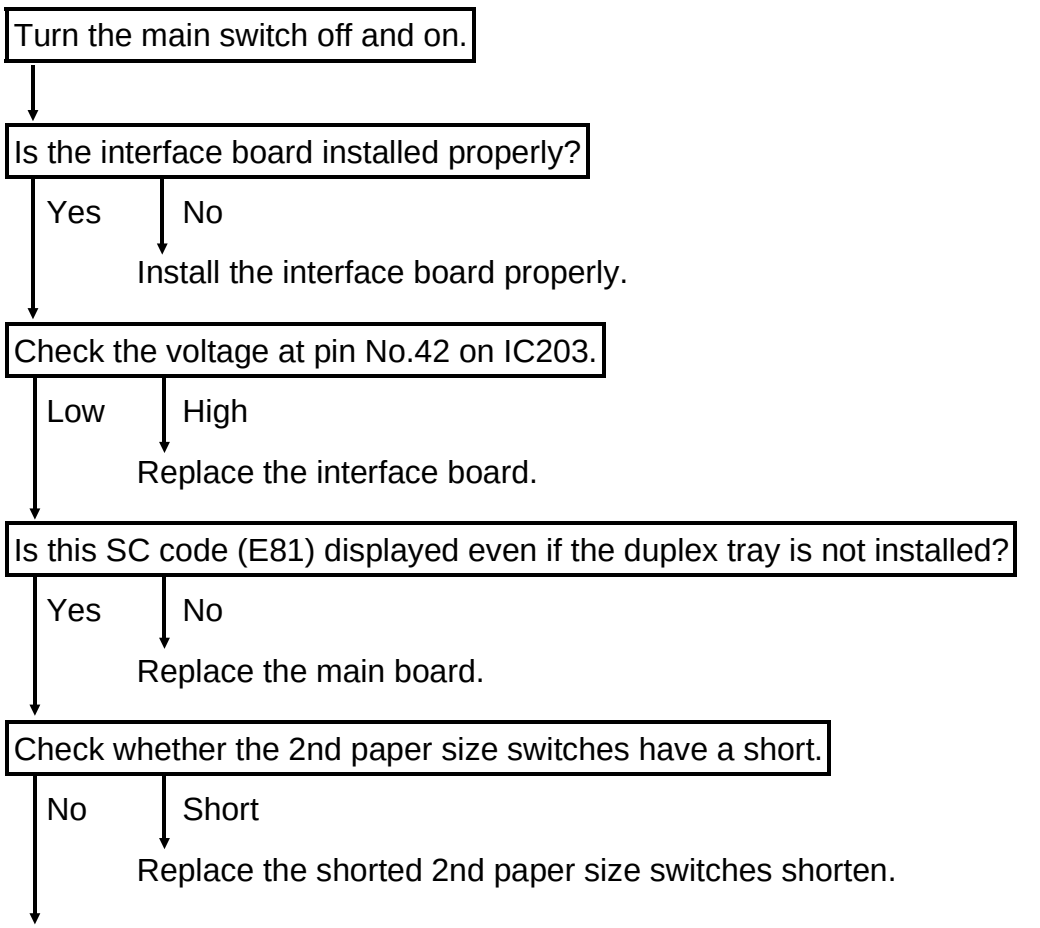
- Definition -

The interface board is not connected when the duplex unit is installed.

- Possible Causes -

- Interface board installed incorrectly
- Interface board defective
- Main board defective
- 2nd paper size switch shorted

- Action -


Turn the main switch off and on.
Is the interface board installed properly?
Yes
No
Install the interface board properly.
Check the voltage at pin No.42 on IC203.
Low
High
Replace the interface board.
Is this SC code (E81) displayed even if the duplex tray is not installed?
Yes
No
Replace the main board.
Check whether the 2nd paper size switches have a short.
No
Short
Replace the shorted 2nd paper size switches shorten.

Replace the main board.

2.16 CODE #82 — JOGGER HOME POSITION ERROR

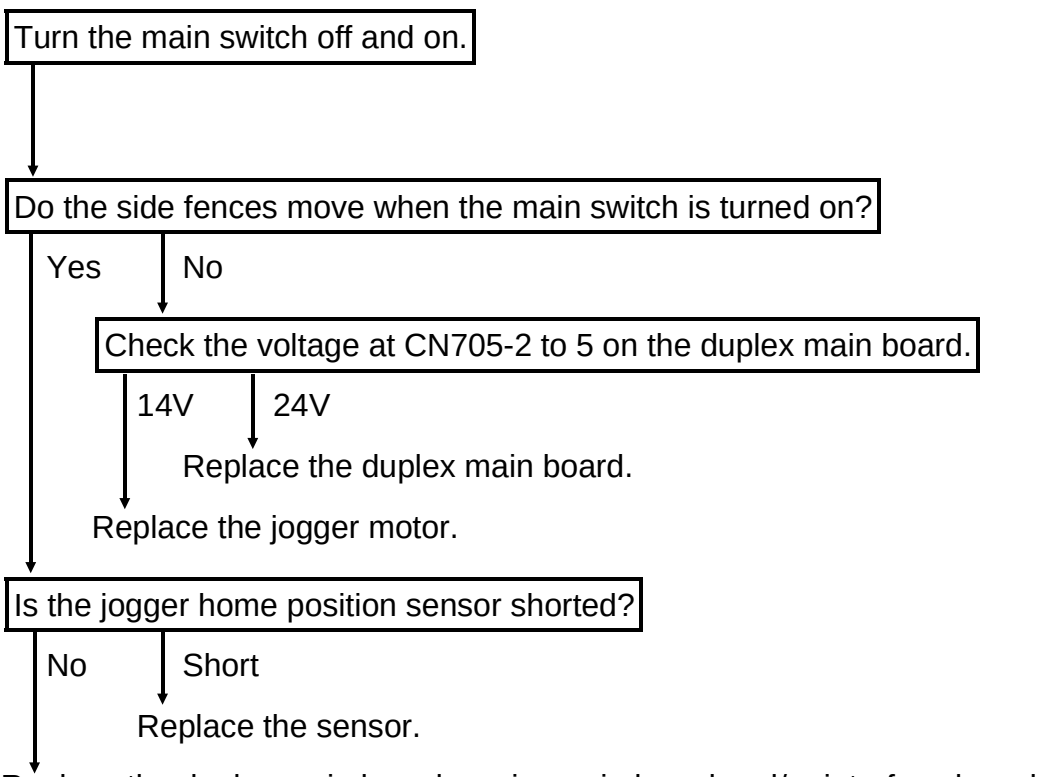
- Definition -

The output of the jogger home position sensor stays LOW while the duplex main board is driving the jogger fences outward.

- Possible Causes -

- Jogger home position sensor shorted
- Jogger motor defective
- Duplex main board defective
- Copier main board defective
- Interface board defective

- Action -


Turn the main switch off and on.
Do the side fences move when the main switch is turned on?
Yes
No
Check the voltage at CN705-2 to 5 on the duplex main board.
14V
24V
Replace the duplex main board.
Replace the jogger motor.
Is the jogger home position sensor shorted?
No
Short
Replace the sensor.
Replace the duplex main board, copier main board and/or interface board.

2.17 CODE #83 — JOGGER HOME POSITION ERROR

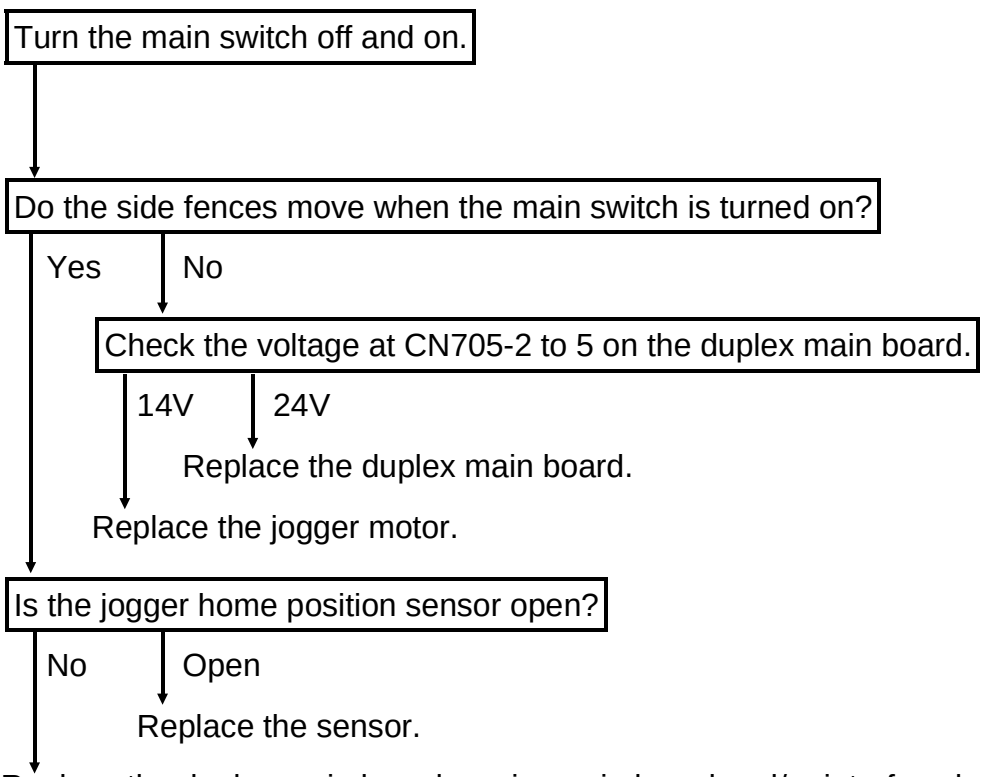
- Definition -

The output of the jogger home position sensor remains HIGH as the duplex main board is driving the jogger fences inward.

- Possible Causes -

- Jogger home position sensor open
- Jogger motor defective
- Duplex main board defective
- Copier main board defective
- Interface board defective

- Action -


Turn the main switch off and on.
Do the side fences move when the main switch is turned on?
Yes
No
Check the voltage at CN705-2 to 5 on the duplex main board.
14V
24V
Replace the duplex main board.
Replace the jogger motor.
Is the jogger home position sensor open?
No
Open
Replace the sensor.

Replace the duplex main board, copier main board and/or interface board.

2.18 ABNORMAL CONDITION IN TONER DENSITY DETECTION

- Phenomenon -

The Auto ID indicator or the selected manual ID level blinks. (No SC Code is indicated.)

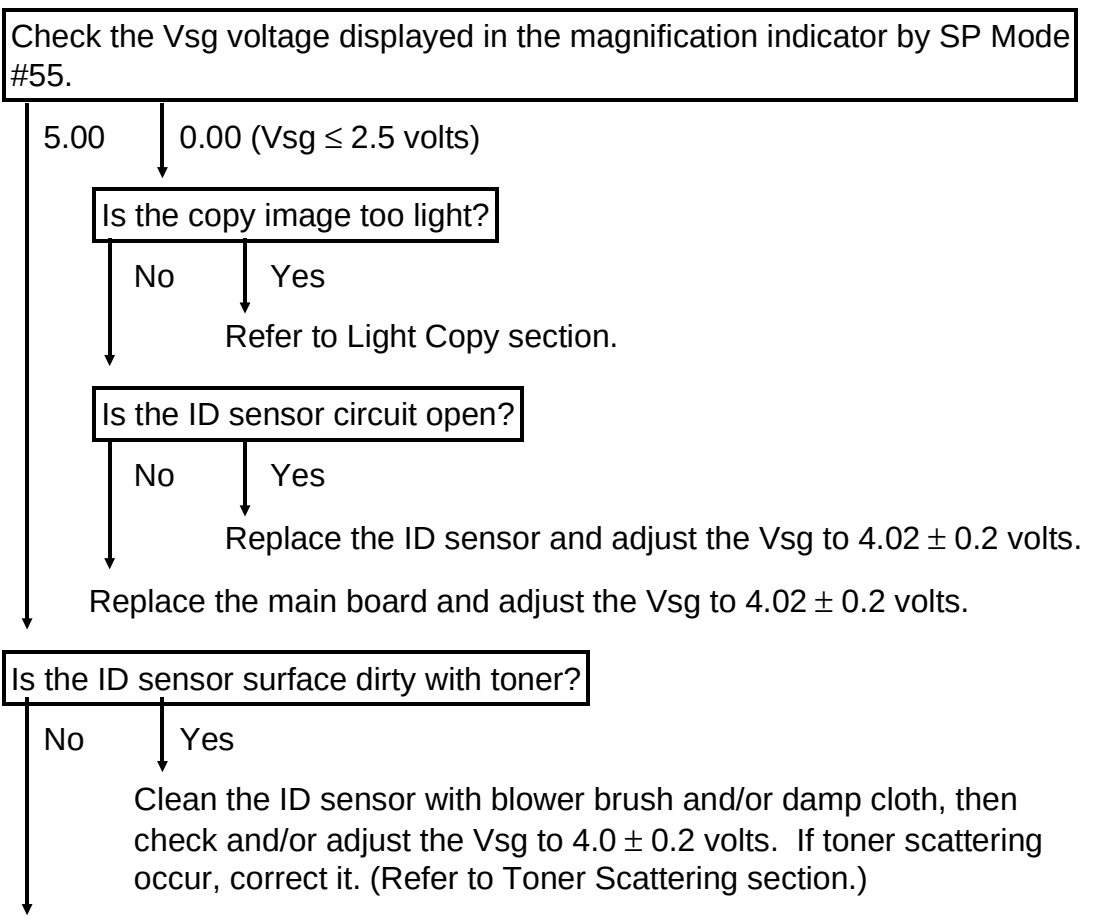
- Definition -

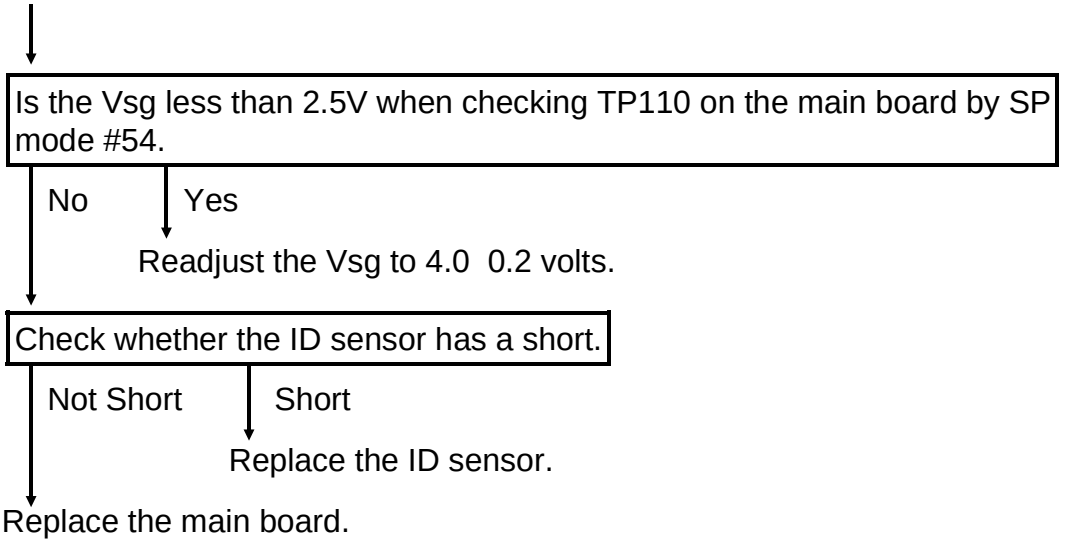
If the Vsg goes below 2.5 volts or Vsp goes above 7.5 volts 5 times in a row.

- Possible Causes -

- Incorrect Vsg voltage
- Dirty ID sensor
- Low toner density
- ID sensor defect
- Main board defect

- Action -


Check the Vsg voltage displayed in the magnification indicator by SP Mode #55.
5.00
0.00 (Vsg ≤ 2.5 volts)
Is the copy image too light?
No
Yes
Refer to Light Copy section.
Is the ID sensor circuit open?
No
Yes
Replace the ID sensor and adjust the Vsg to 4.02 ± 0.2 volts.
Replace the main board and adjust the Vsg to 4.02 ± 0.2 volts.
Is the ID sensor surface dirty with toner?
No
Yes
Clean the ID sensor with blower brush and/or damp cloth, then check and/or adjust the Vsg to 4.0 ± 0.2 volts. If toner scattering occur, correct it. (Refer to Toner Scattering section.)


Is the Vsg less than 2.5V when checking TP110 on the main board by SP mode #54.
No
Yes
Readjust the Vsg to 4.0 0.2 volts.
Check whether the ID sensor has a short.
Not Short
Short
Replace the ID sensor.
Replace the main board.

3. ELECTRICAL COMPONENT DEFECTS

3.1 SENSOR

Component	Condition	Symptom
Scanner Home Position Sensor (S1)	OPEN (CN122-4 stays HIGH)	SC code (E22) is displayed.
	SHORTED (CN122-4 stays LOW)	SC code (E21) is displayed.
Lens Home Position Sensor (S2)	OPEN (CN102-8 stays HIGH)	SC code (E29) is displayed.
	SHORTED (CN102-8 stays LOW)	SC code (E28) is displayed.
4th/5th Mirror Home Position Sensor (S3)	OPEN (CN102-11 stays HIGH)	SC code (E2A) is displayed.
	SHORTED (CN102-11 stays LOW)	SC code (E2B) is displayed.
Registration Sensor (S4)	OPEN (CN101-9 stays HIGH)	"Check Paper Path" indicator (location "A" or "B") blinks when a copy is made.
	SHORTED (CN101-9 stays LOW)	"Check Paper Path" indicator (location "A" or "B") lights when the main switch is turned on.
Exit Sensor (S5)	OPEN (CN141-2 stays HIGH)	"Check Paper Path" indicator (location "D") blinks when a copy is made.
	SHORTED (CN141-2 stays LOW)	"Check Paper Path" indicator (location "D") lights when the main switch is turned on.
Paper End Sensor 1st and 2nd (S6 and S7)	OPEN (1st: CN125-5 stays HIGH) (2nd: CN139-4 stays HIGH)	"Load Paper" indicator lights even when paper is in the cassette or tray.
	SHORTED (1st: CN125-5 stays LOW) (2nd: CN139-4 stays LOW)	"Load Paper" indicator lights even when the cassette or tray is empty.
Toner End Sensor (S8)	OPEN (CN114-2 stays HIGH)	The CPU detects toner end condition using Vsp/Vsg value. If the ID sensor is defective, the CPU fails to detect toner end and the image density may become too low.
	SHORTED (CN114-2 stays LOW)	
Toner Overflow Sensor (S9)	OPEN (CN101-2 stays HIGH)	"E70" blinks in the magnification indicator even when used toner tank is not full.
	SHORTED (CN101-2 stays LOW)	"E70" does not blink.

Paper Lift Sensor (S10)	OPEN (CN125-2 stays HIGH)	User Code #5 is displayed.
	SHORTED (CN125-2 stays LOW)	The cassette bottom plate does not rise to the paper feed position.
Component	**Condition**	**Symptom**
Image Density (ID Sensor) (S11)	OPEN (CN110-3 stays HIGH)	The CPU detects an ID sensor abnormal condition. The ADS or Manual Image Density indicator starts blinking.
	SHORTED (CN110-3 stays LOW)	
Development Unit Set Sensor (S12)	OPEN (CN123-2 stays HIGH)	The CPU fails to detect User Code #3 even when the development unit is not set.
	SHORTED (CN123-2 stays LOW)	User code #3 is displayed even when the development unit is set.

3.2 SWITCH OR OTHER ELECTRICAL COMPONENT

Component	Condition	Symptom
Main Switch (SW1)	OPEN	The copier does not turns on.
	SHORTED	The copier does not turns off.
Cover Safety Switch (SW2)	OPEN	The copier does not tunrs on.
	SHORTED	The copier does not turn off when the front or exit cover is opened.
Paper Size Switch (1st and 2nd) (SW3 to 9)	OPEN	The CPU cannot detect proper paper size, and misfeeds may occur when a copy is made.
	SHORTED	
Color Switch (SW8)	OPEN (CN114-4 and/or 6 stays HIGH)	The CPU cannot properly control the copy process system for the development unit (black or color). This may cause an abnormal image (dirty backfround, light copy, etc.)
	SHORTED (CN114-4 and/or 6 stays LOW)	
Manual Feed Table Switch (SW9)	OPEN (CN114-8 stays HIGH)	The CPU does not detect manual feed mode even when the manual feed table is opened.
	SHORTED (CN114-8 stays LOW)	The "Manual Feed" indicator stays on even when the manual feed table is closed.
Right Cover Switch (SW10)	OPEN (CN117-2 stays HIGH)	The CPU does not display User Code #1 even when the right cover is opened.
	SHORTED (CN117-2 stays LOW)	User Code #1 is displayed even when the right cover is closed.
Exposure Lamp (L1)	OPEN	SC Code (E11) is displayed.
Fusing Lamp (L2)	OPEN	SC Code (E52) is displayed.
Fusing Thermistor (TH)	OPEN	SC Code (E55) is displayed.
Fusing Thermofuse (TF)	OPEN	SC Code (E52) is displayed.
Optics Thermoswitch (TS)	OPEN	SC Code (E11) is displayed.

3.3 FUSE

Component	Condition	Symptom
FU401 (AC Drive Board)	OPEN	The copier does not turn on when the main switch is turned on.
FU100 (5V) (Main DC PSU)	OPEN	The copier does not turn on even when the main switch is turned on.
FU101 (24V) (Main DC PSU)	OPEN	SC Code #21 or #22 is displayed depending on the 1st scanner position.
FU102 (30V) (Main DC PSU)	OPEN	SC Code #21 or #22 is displayed depending on the 1st scanner position.
FU100 (5V) (Optional DC PSU)	OPEN	Duplex Tray: SC Code #80 is displayed. ADF: The feed-out motor starts rotating when the main switch is turned on.
FU101 (24V) (Optional DC PSU)	OPEN	Duplex Tray: SC Code #80 is displayed. ADF: The ADF does not work.

SECTION 8

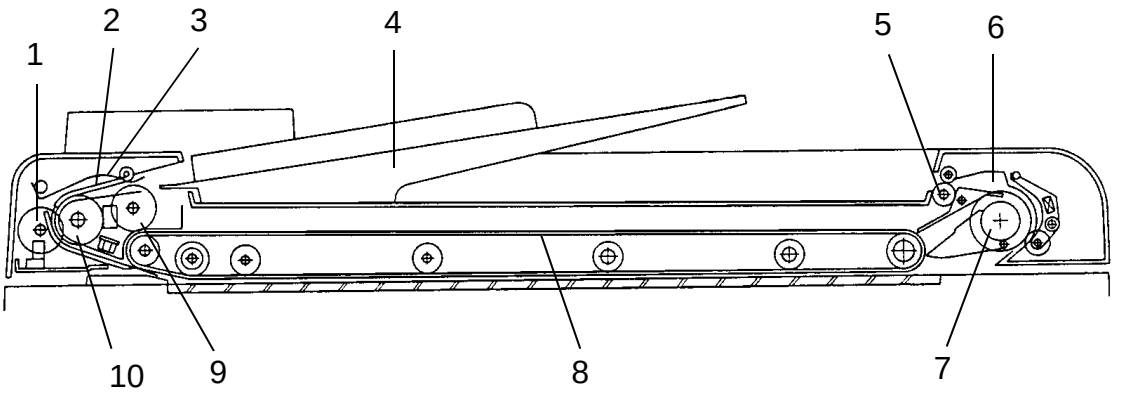
DOCUMENT FEEDER

1. SPECIFICATIONS

Original Size and Weight:	— Thin original mode — Maximum A3 / 11" x 17" Minimum B6 / 5 1/2" x 8 1/2" Weight 41 to 128 g/m^2 (11 to 34 lb) — Thick original mode — Maximum A3 / 11" x 17" Minimum B6 / 5 1/2" x 8 1/2" Weight 52 to 128 g/m^2 (14 to 34 lb) — Auto reverse mode — Maximum A3 / 11" x 17" Minimum B6 lengthwise / 5 1/2" x 8 1/2" lengthwise Weight 64 to 105 g/m^2 (17 to 28 lb)
Original Feed:	Automatic feed — ADF mode Manual feed one by one — SADF mode
Original Table Capacity:	30 sheets / 80 g/m^2 (20 lb)
Original Set:	Face up. First sheet on top
Original Transport:	One flat belt
Copy Speed:	16 copies/minute for A4 / 8 1/2" x 11" sideways
Power Consumption:	20 W
Dimensions (W x D x H):	670 x 460 x 103 mm (26.4" x 18.1" x 4.1")
Weight:	Approximately 8.8 kg (19.4 lb)

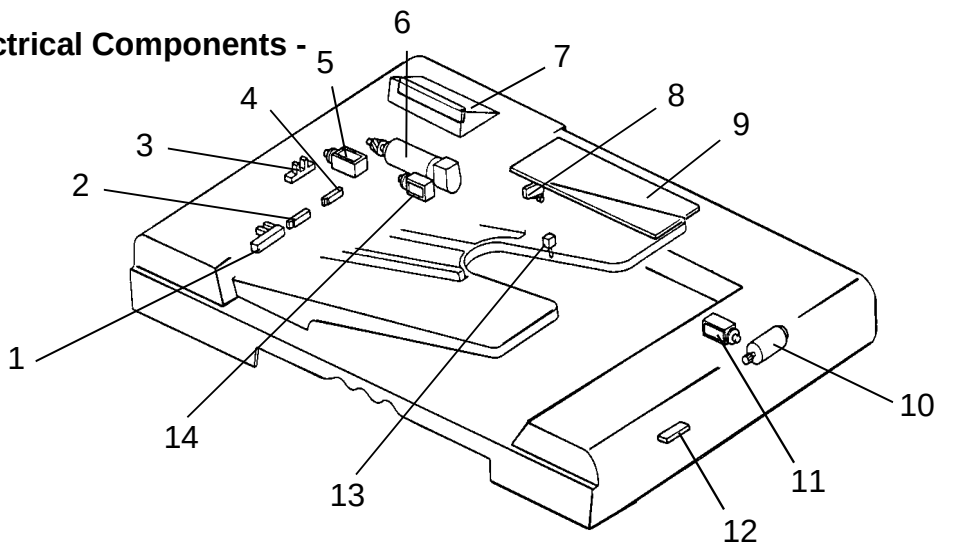
2. COMPONENT LAYOUT

- Mechanical Components -



1. Pulse Generator Disk
2. Friction Belt
3. Pick-up Lever
4. Original Table
5. Exit Roller
6. Inverter Pawl
7. Inverter Roller
8. Transport Belt
9. Pick-up Roller
10. Feed Roller

- Electrical Components -

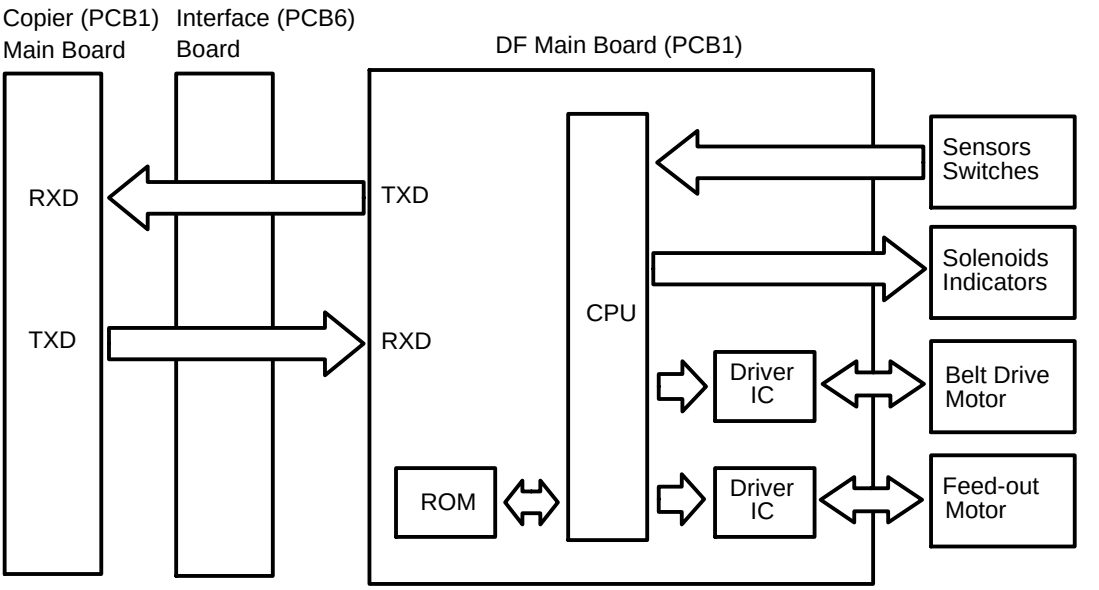


1. Original Set Sensor
2. Registration Sensor
3. Pulse Generator Sensor
4. Original Width Sensor
5. Pick-up Solenoid
6. Belt Drive Motor
7. Indicator Panel
8. Lift Switch
9. DF Main Board
10. Feed-out Motor
11. Inverter Solenoid
12. Feed-out Sensor
13. Original Select Switch
14. Feed-in Solenoid

3. ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function	Location
Motors			
M1	Belt Drive Motor	DC servomotor that drives to the transport belt and feed-in system (pick-up roller, feed roller, pull-out roller and relay roller).	6
M2	Feed-out Motor	DC servomotor that drives the feed-out unit of the DF.	10
Solenoids			
SOL1	Pick-up Solenoid	Energizes to press the pick-up lever against the stack of originals in preparation for original feed-in.	5
SOL2	Feed-in Solenoid	Turns on to engage the feed-in clutch so rotation is transmitted to the feed roller, pull-out rollers, and relay rollers.	14
SOL3	Inverter Solenoid	Energizes to invert the original when copying two sided originals.	11
Switches			
SW1	Lift Switch	Informs the CPU when the DF is lifted and also serves as the jam reset switch for the DF.	8
SW2	Original Select Switch	Selects thick original mode or thin original mode.	13
Sensors			
S1	Original Set Sensor	Informs copier CPU that originals have been placed and causes the Insert Original indicator to go out.	1
S2	Registration Sensor	Sets original stop timing and measures original length.	2
S3	Original Width Sensor	Determines the width of the originals.	4
S4	Pulse Generator Sensor	Generates pulses used to measure the original length.	3
S5	Feed-out Sensor	Checks for original misfeeds and sets original stop timing when in auto reverse mode.	12
Printed Circuit Boards			
PCB1	DF Main Board	Controls all DF functions.	9
PCB2	Indicator Panel Board	Contains operator indicators.	7

4. OVERALL MACHINE CONTROL



The DF CPU monitors the input signals from the sensors and switches, and energizes the solenoids and the indicator LEDs directly. The belt drive motor and the inverter motor are controlled by the DF CPU through their respective driver ICs. The exchanged signals are shown in the tables on the next page.

1. DF → Copier

No.	Signal Name	Definition
1	Original Set	Originals are set on the original table
2	Copy Start	Allows the copier to start copy sequence
3	Lift Up	The DF is lifted
4	DF Misfeed	Misfeed occurs in the DF

2. Copier → DF

No.	Signal Name	Definition
1	Feed-in	Requests the DF to feed-in the original
2	Feed-out	Requests the DF to feed-out the original
3	Invert Original	Requests the DF to invert the original
4	Auto Feed	Shifts the DF to the auto feed mode
5	Original Stay	Attempt to use DF but the original from the previous copy run remains on the exposure glass

5. BASIC OPERATION

1. One-sided Original Feed

When an original is inserted face up into the DF, the Insert Original indicator light goes out and the DF informs the copier CPU that originals have been set.

When the Start key is pressed, the copier CPU sends the feed-in signal to the DF. On receipt of this signal, the DF energizes the pick-up solenoid, the feed-in solenoid, and the belt drive motor in order to feed-in the bottom sheet of the original stack onto the exposure glass. The pick-up solenoid and the feed-in solenoid remain energized until the original leading edge reaches the DF registration sensor. The belt drive motor turns off shortly after the original's trailing edge passes the DF registration sensor.

While feeding the original, the DF registration sensor and the paper width sensor check the original size.

Just when the original trailing edge has passed the DF registration sensor, the DF CPU sends the copy start signal to the copier. On receipt of the signal, the copier CPU carries out the original ID measurement while returning the scanner to the home position and starts the copy cycle.

When the scanner reaches the return position, the copier CPU sends the feed-out and the feed-in signals to the DF CPU in order to exchange the original with the next original. At this time, the scanner begins returning to the home position, but stays 100 mm away from the left scale until the next original is on the exposure glass. At this time the original ID measurement is taken.

When the scanner comes to the return position after scanning the last original, the copier CPU only sends the feed-out signal in order to feed-out the last original.

2. Two-sided Original Feed

Unlike one-sided original feed, the back side of the original must be copied first to keep the originals and copies in the correct order.

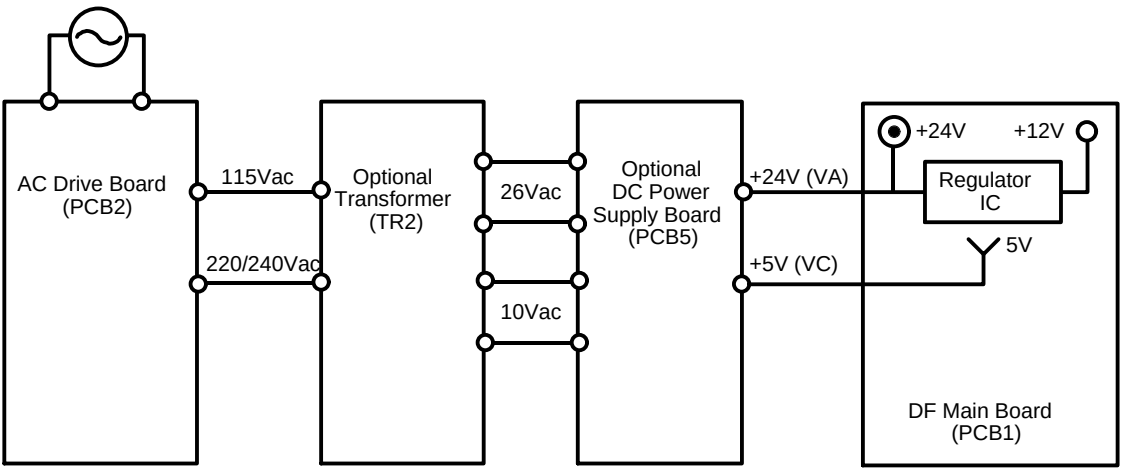
During original feed-in, the sequence is the same as for one-sided feed; however, the DF CPU also energizes the inverter motor and the inverter solenoid a short time after the original trailing edge has passed the DF registration sensor. The belt drive motor continues to feed the original until the original leading edge passes the feed-out sensor. At this point the inverter mechanism inverts the original, in preparation for copying the back side. Then the belt drive motor reverses and the original is fed towards the left scale and is aligned against the scale. The DF CPU sends the copy start signal a short time after the original trailing edge has passed the feed-out sensor.

When the scanner reaches the return position, the copier CPU sends the invert original signal to the DF CPU in order to make a copy of the front side. The original is inverted in the same way as for back side copying.

3. Semi-automatic Document Feed

If a single original is inserted into the original table and copied, the DF shifts to the semi-automatic feed mode and lights the Auto Feed indicator. The Auto Feed indicator remains on for five seconds after the copier main motor stops. If another original is inserted within that five-second period, it is automatically fed and copied.

6. POWER DISTRIBUTION

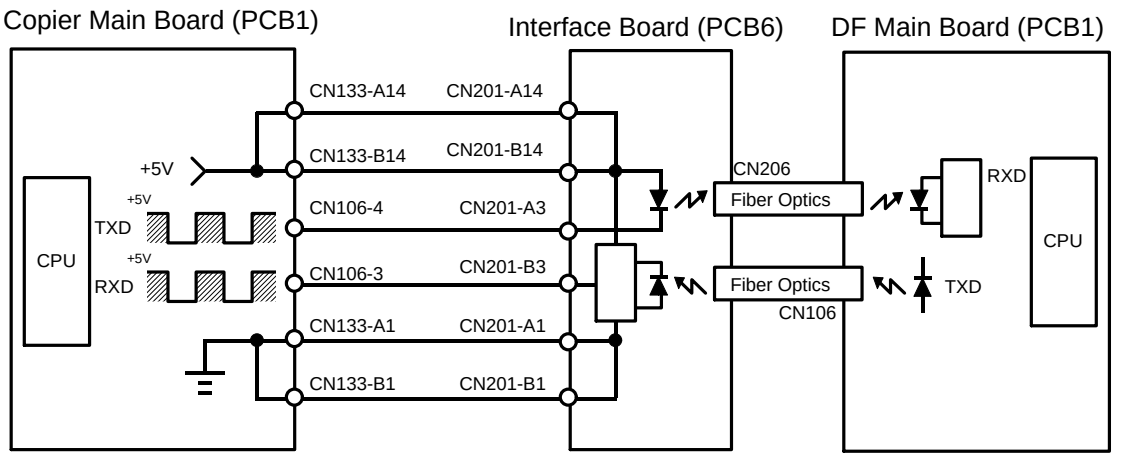


The DF uses three DC power levels: +24 volts, +12 V, and +5 V.

When the main switch is turned on, the optional transformer receives the wall outlet ac power through the ac drive board and outputs 10 volts ac and 26 volts ac to the optional dc power supply board. The optional dc power supply board then converts the 10 volts ac input to +5 volts dc and the 26 volts ac input to +24 volts. Then, thoes two dc voltsges are supplied to the DF main board.

The regulator IC on the DF main board further steps down the +24V to +12V.

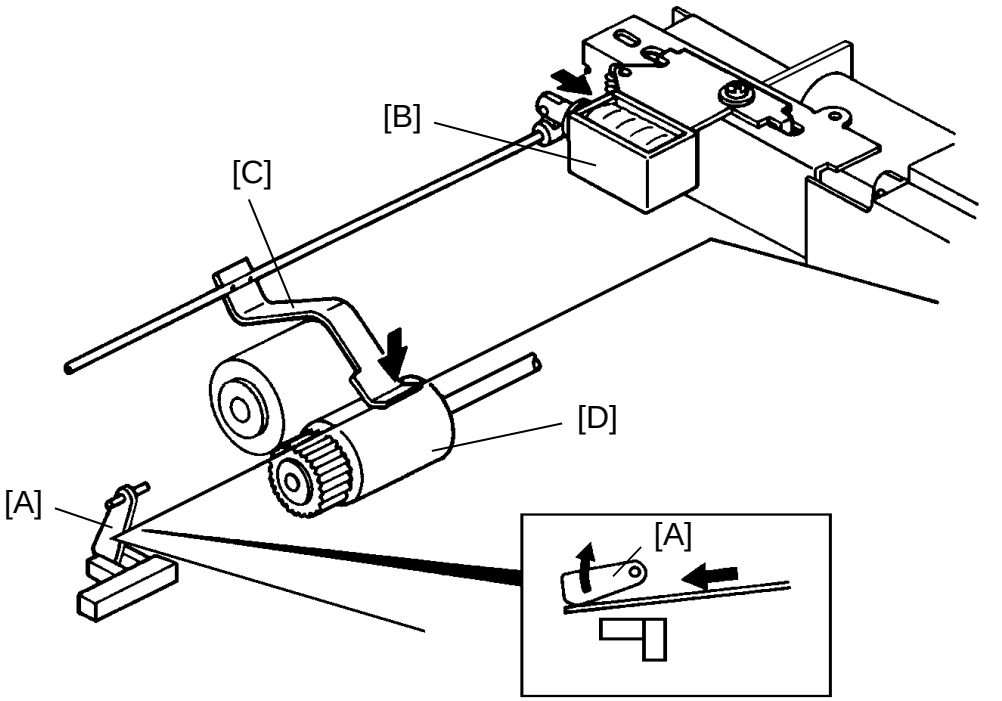
7. INTERFACE CIRCUIT



The copier CPU and the DF CPU communicate via the interface board and fiber optics. The interface board changes the optical signals to electrical signals (and vice versa).

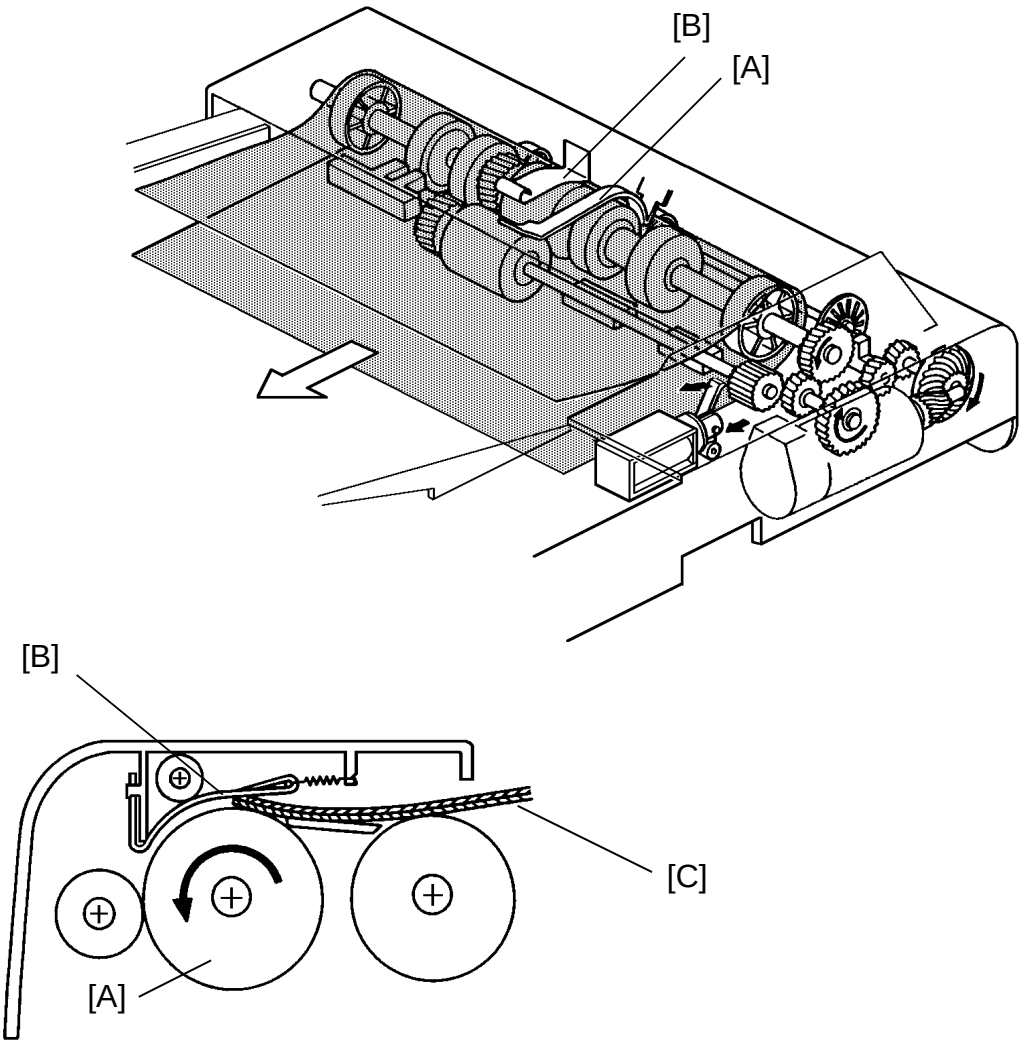
8. ORIGINAL FEED

8.1 ORIGINAL PICK-UP



After setting the originals on the original table, the originals contact the feeler [A] of the original set sensor and cause the feeler to move out of the sensor. The DF then sends the original set signal to the copier CPU to inform it that the DF will be used. When the Start key is pressed, the pick-up solenoid [B] is energized. The original stack is then pressed between the pick-up lever [C] and pick-up roller [D]. The rotation of the pick-up roller advances the bottom original.

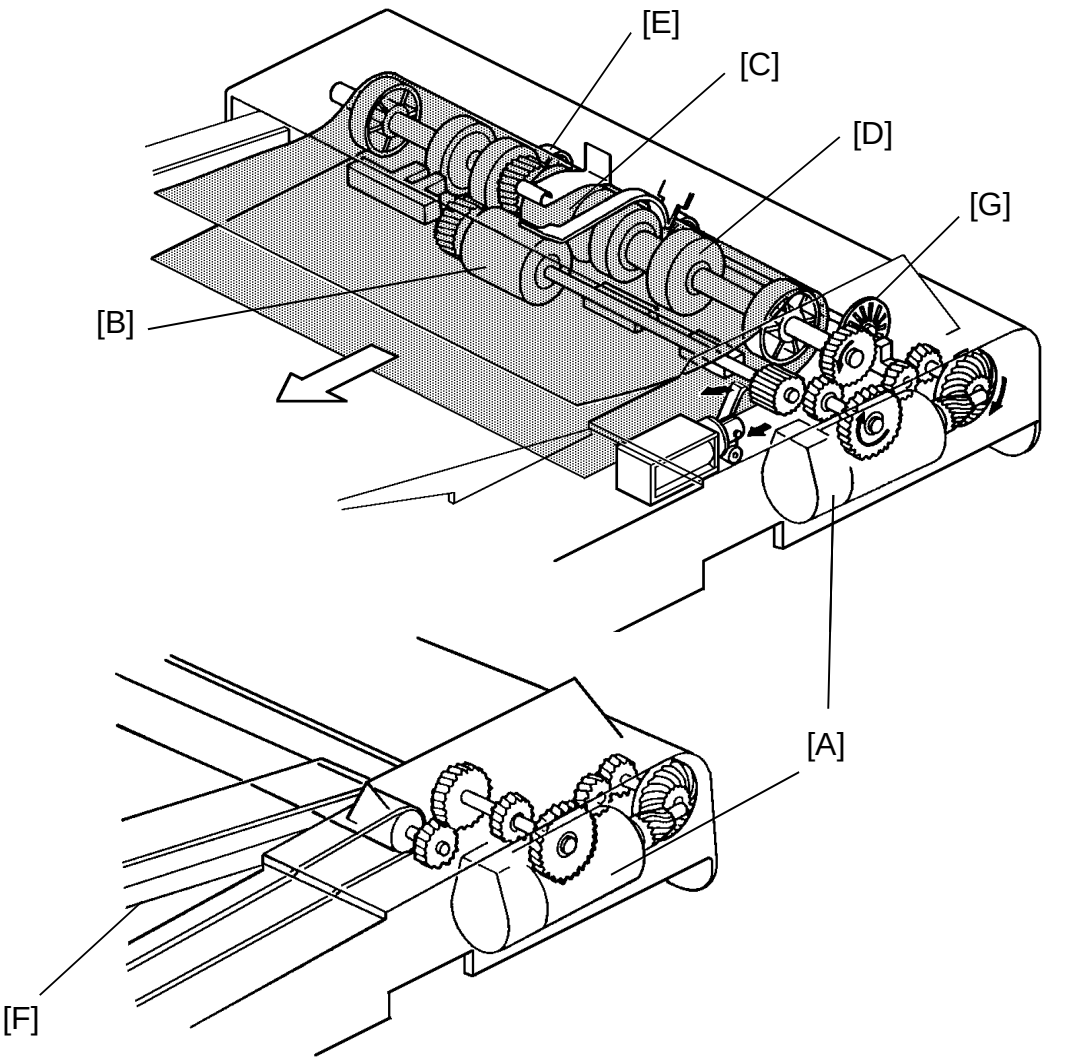
8.2 ORIGINAL SEPARATION



The feed roller [A] and the friction belt [B] are used to feed-in and separate the originals [C]. Only the bottom original is fed because the friction belt prevents any other originals from feeding.

Original feed starts when the feed roller starts turning and advances the bottom original of the stack. The feed roller moves the original past the friction belt because the driving force of the feed roller is greater than the resistance of the friction belt. The friction belt prevents multiple feeds because the resistance of the friction belt is greater than the friction between original sheets.

8.3 ORIGINAL FEED-IN MECHANISM

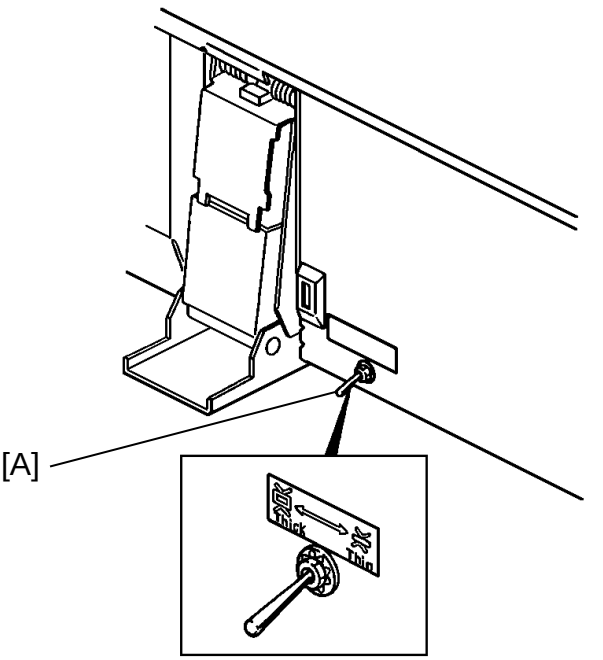


The belt drive motor [A] drives the pick-up roller [B], the feed roller [C], the pull out roller [D], the relay roller [E], and transport belt [F] via a feed clutch and a gear train.

The pick-up and feed-in solenoids are energized 100 milliseconds after the Start key of the copier is pressed. Then 100 milliseconds after the solenoids are energized, the belt drive motor starts turning. The pulse generator disc [G] always turns when the belt drive motor is on.

Slightly after the original trailing edge passes the registration sensor, the relay rollers and the transport belt stop turning.

This document feeder has two different ways of stopping originals at the correct position on the exposure glass. They are called the "thin original mode" and the "thick original mode". The mode used is determined by the original select switch [A].



- Original Select Switch -

1. Thin Original Mode

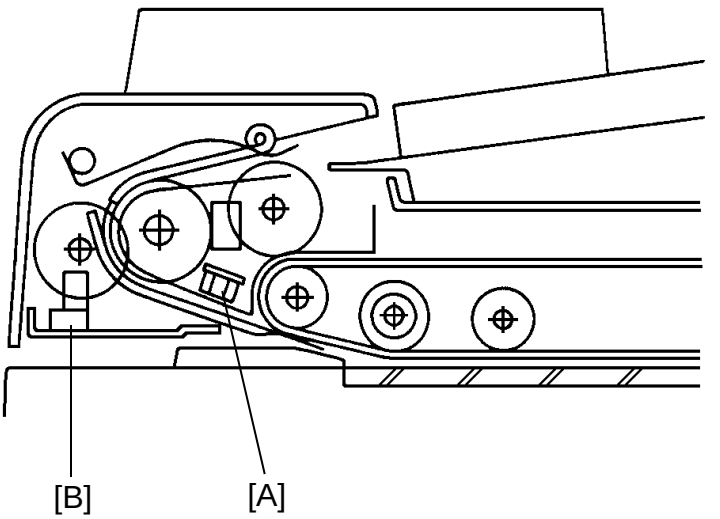
The original is stopped at the correct position on the exposure glass based on encoder pulse count. The belt drive motor stops shortly after the original trailing edge passes the DF registration sensor. (Exact timing depends on registration adjustment.) Thin original mode is selected at the factory.

2. Thick Original Mode

When thick original mode is selected, the belt drive motor remains energized for an additional 30 encoder pulses as compared to thin original mode. Then, the belt drive motor pauses and reverses for 21 pulses. This forces the original against the left scale and thus aligns the edge of the original with the scale.

After the exposure cycle is completed, the copier sends the feed-out signal to the DF CPU and the belt drive and feed out motors start turning. At this time, the copied original feeds out and the next original feeds in.

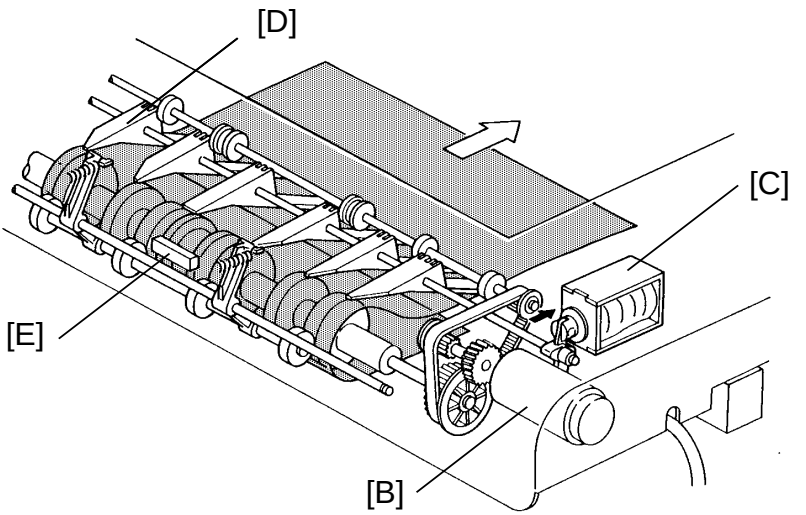
8.4 ORIGINAL SIZE DETECTION



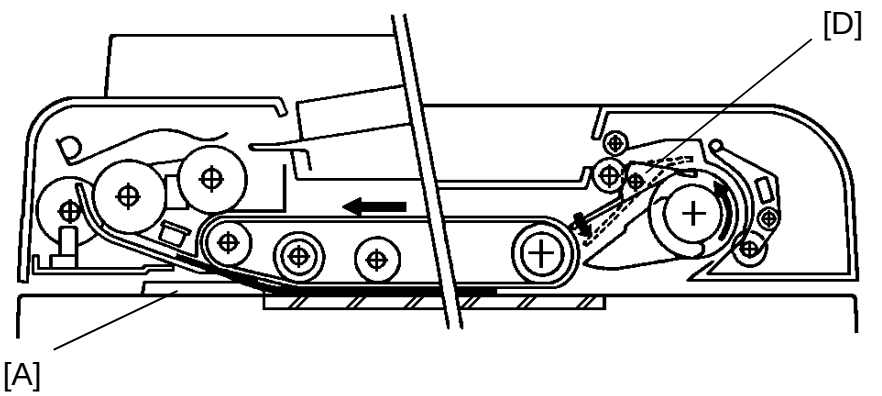
The DF determines original size (both width and length) through the use of the original width sensor [A], registration sensor, and pulse generator sensor [B]. The original's length is calculated by counting the number of pulses from the pulse generator while the registration sensor is on.

Original size detection is necessary for the feed-in/feed-out timing of the DF.

8.5 ORIGINAL INVERSION MECHANISM



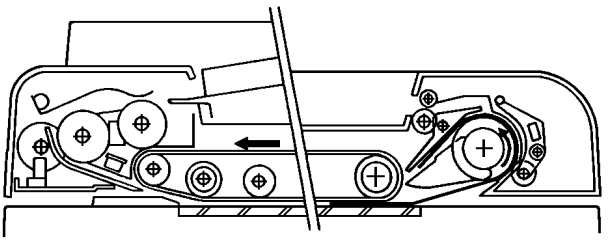
1)



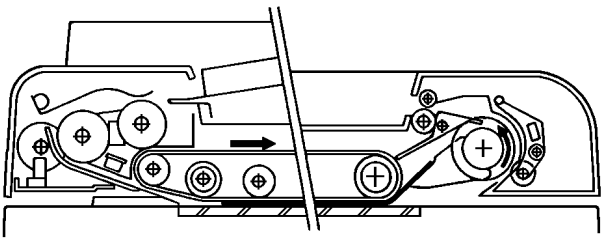
The two sided originals are inverted in the feed-out unit.

1) When the copier Start key is pressed, the two sided original is fed into the feed-in unit, passing over the DF registration sensor [A]. The feed-out motor [B] and the inverter solenoid [C] turn on 100 milliseconds after the original trailing edge passes the registration sensor. When the inverter solenoid turns on, the inverter pawls [D] rotate counterclockwise.

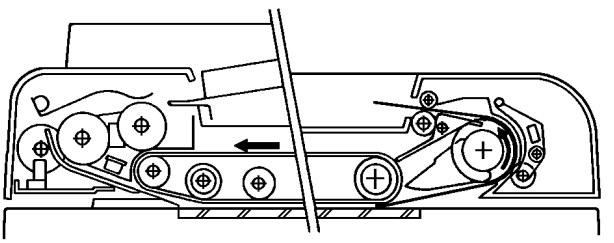
2) 4)



3) 5)



6)



2) The original passes over the exposure glass and feeds into the feed-out unit.

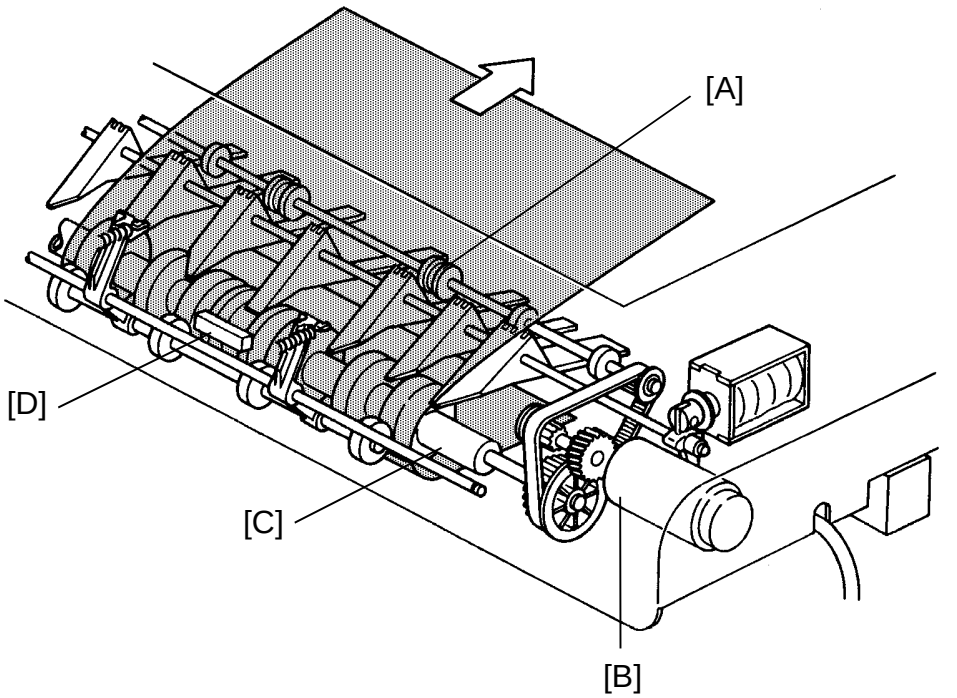
3) The original is directed onto the exposure glass again by the inverter pawls. The belt drive motor now reverses 140 milliseconds after the feed out sensor [E] turns on. The transport belt then moves the original toward the left scale. Slightly before the original reaches the left scale, the belt drive motor drops to half speed. This is to prevent damaging the edge of the original against the left scale.
When the original leading edge reaches the left scale, the belt drive motor stops. At the same time, the feed-out motor and the inverter solenoid turn off.

4) After the reverse side of the original is exposed, the belt drive motor, the feed-out motor, and the inverter solenoid turn on, and the original is fed into the inverter section. (This is the same as step 2 above.)

5) The original is fed onto the exposure glass again as in step 3 above. The front side of the original is then copied.

6) After the front side of the original has been exposed, the original is fed out from the DF.

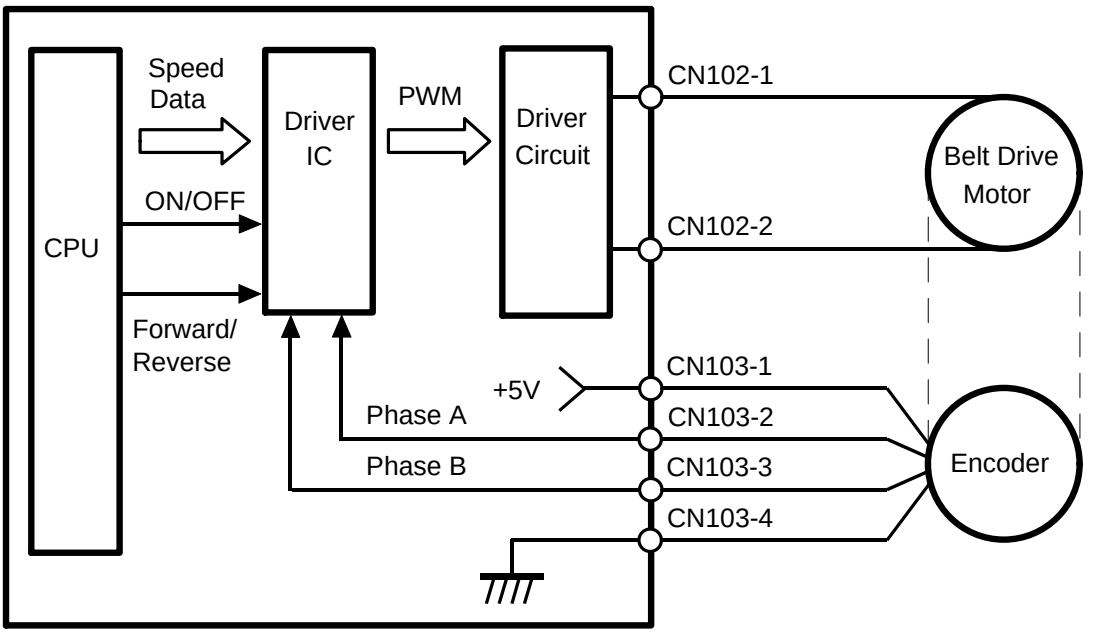
8.6 ORIGINAL FEED-OUT MECHANISM



The exit rollers [A] are driven by the inverter motor [B]. When the document feeder receives the feed out signal from the copier, the transport belt and the exit rollers start turning simultaneously. The transport belt carries the original to the inverter rollers [C] and the exit rollers take over the original feed-out. When the original trailing edge passes the feed-out sensor [D], the feed-out motor drops to half of its normal speed for 220 milliseconds and then stops. The lower speed prevents uneven stacking of originals. For A3 or double letter size originals, the feed-out motor speed does not change due to the length of the originals.

8.7 BELT DRIVE MOTOR CIRCUIT

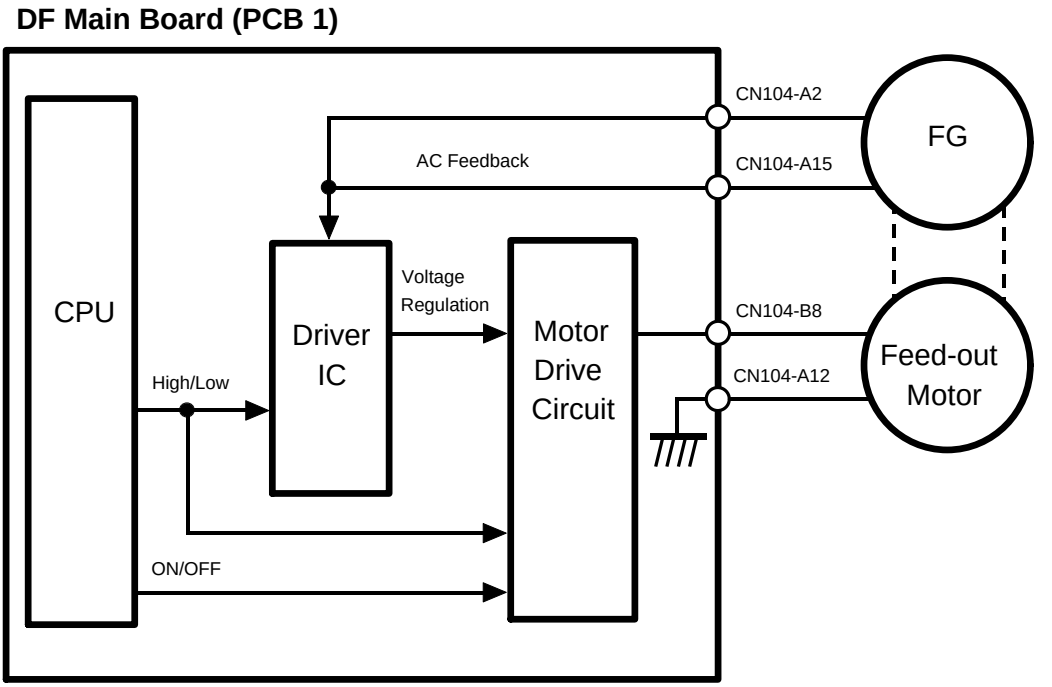
DF Main Board (PCB 1)



A dc servomotor is used as the belt drive motor. The driver IC controls the speed of the belt drive motor. The CPU sends the speed data (programmed) to the driver IC. The driver IC sends the pulse-width-modulation (PWM) signal to the driver circuit, which sends the motor drive pulses.

An encoder in the servomotor has two magnetic sensors that generate two pulse signals (phase A and B). The driver IC monitors the belt speed and direction by these pulse signals and uses this data to regulate the motor's speed.

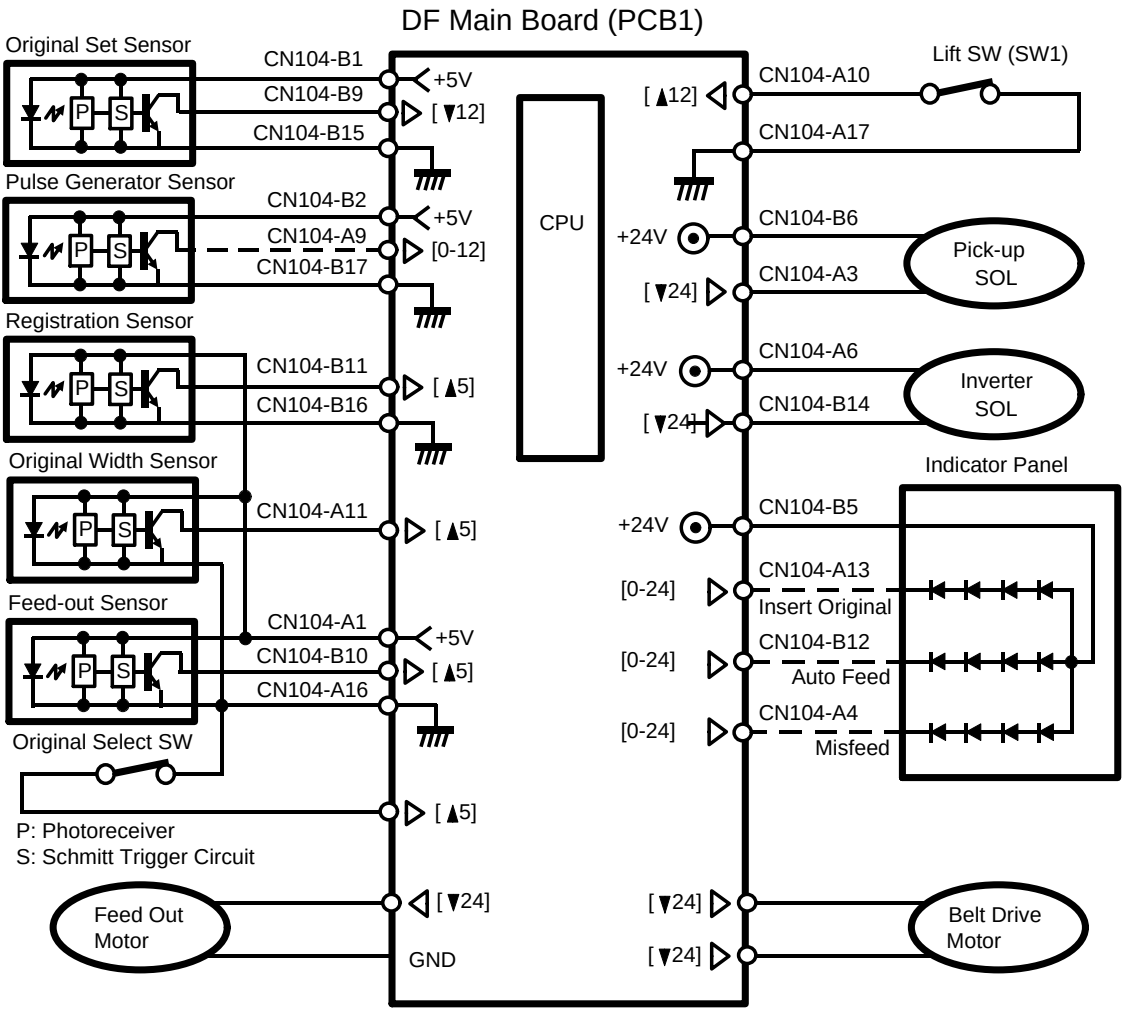
8.8 FEED-OUT MOTOR CIRCUIT



The DF CPU sends the speed data (high or low) to the driver IC and the motor drive circuit. The motor drive circuit creates the PWM signal and sends the motor drive pulses to the feed-out motor.

The frequency generator of the feed-out motor makes a very low voltage ac current which is fed back to the driver IC. The driver IC monitors the frequency of this ac current and based on the frequency it regulates the motor speed.

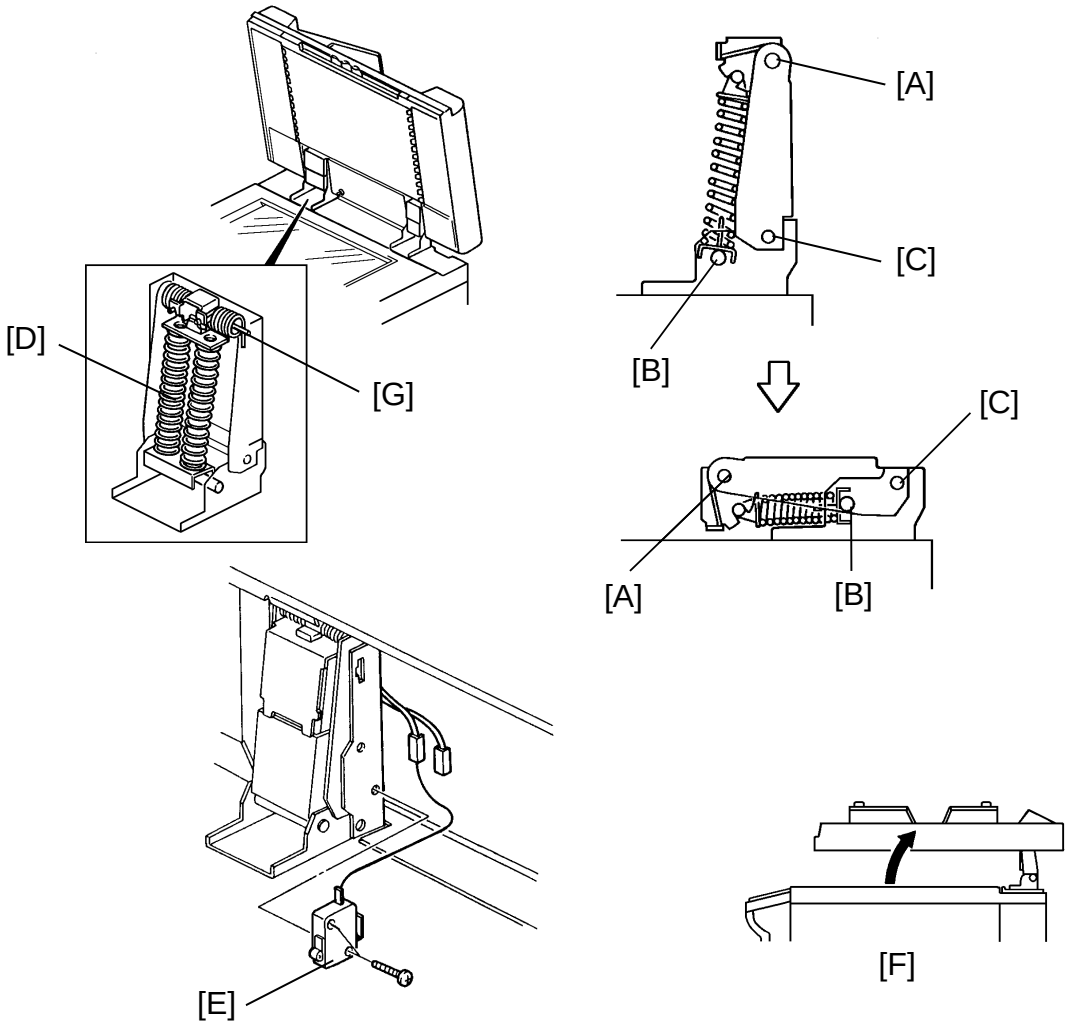
8.9 INPUT AND OUTPUT CIRCUITS



The above devices are directly controlled and monitored by the CPU. The solenoids and indicator panel are energized with +24 volts. The sensors and switches are energized with +12 volts or +5 volts.

To energize a solenoid or indicator, the CPU drops the connected trigger line from +24 volts to LOW. The CPU monitors the input lines of the sensors and switch to determine when they are activated.

9. LIFT MECHANISM



When the document feeder is opened, the lift springs [D] provide enough force to ensure that the document feeder does not fall onto the exposure glass. When the document feeder is closed, points "A", "B", and "C" are aligned and no such force is provided to the document feeder.

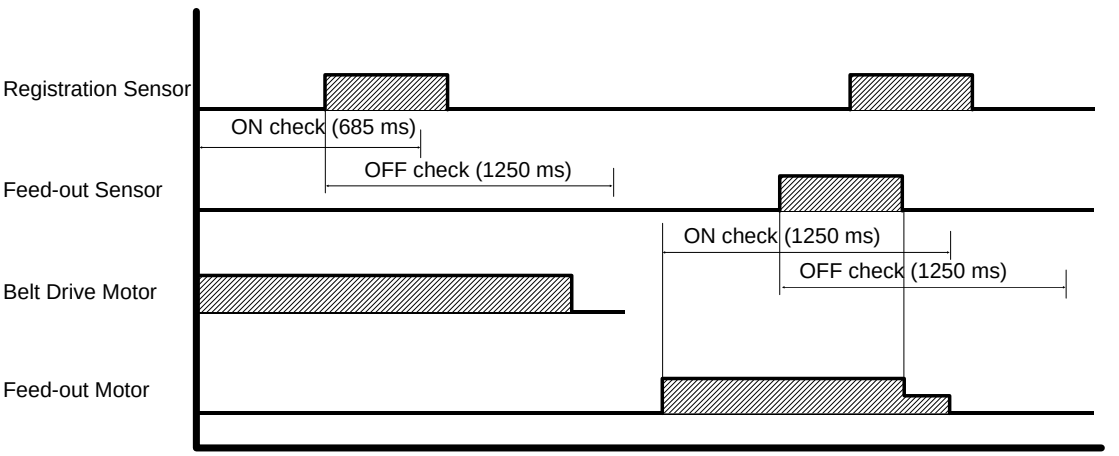
The lift switch [E] is actuated when the document feeder is closed. The copier then shifts to the document feeder mode. The lift switch also serves as the reset switch for document feeder misfeeds.

When a book or thick (maximum thickness 60 mm) original is copied, the DF acts as a cover for the original as shown in the figure [F]. The lift switch is turned off during this condition, so the DF does not function. The tension of spring [G] returns the DF to the normal condition after copying a thick original.

10. ORIGINAL MISFEED DETECTION

The registration sensor and the feed-out sensor are used for misfeed checks.

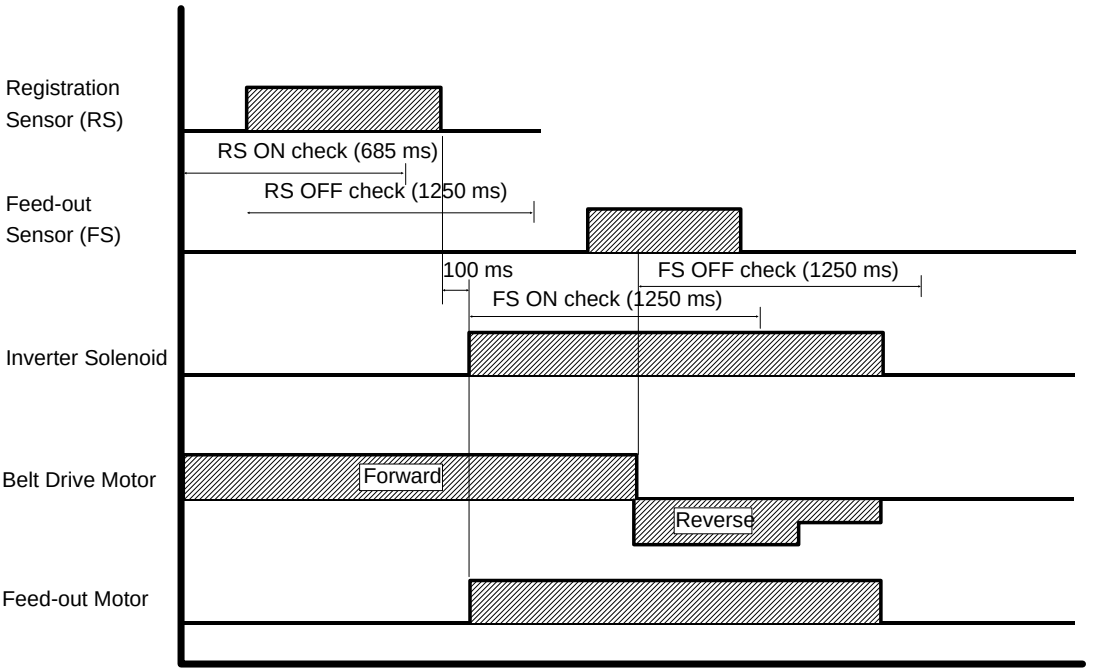
1. One sided original



If the registration sensor is not actuated within 685 milliseconds after the belt drive motor starts turning, the Original Misfeed indicator lights (ON check).

If the registration sensor does not turn off within 1,250 milliseconds, the CPU determines that there has been an original misfeed (OFF check). The Original Misfeed indicator also lights if the feed-out sensor is not actuated within 1,250 milliseconds after the feed-out motor starts turning (ON check) or if the feed-out sensor does not turn off within 1,250 milliseconds after the feed-out sensor is actuated (OFF check).

2. Two sided original



The registration ON/OFF check is the same as for one-sided originals. The inverter motor and the inverter solenoid turn on 100 milliseconds after the registration sensor turns off. If the feed-out sensor is not actuated within 1,250 milliseconds after the feed-out motor starts turning, the Original Misfeed indicator lights (ON check). The Original Misfeed indicator also lights if the feed-out sensor does not turn off within 1,250 milliseconds after the belt drive motor reverses (OFF check).

If a previous original remains on the exposure glass after manual copying and DF feed is attempted, the original misfeed indicator lights. When the DF is lifted and the previous original is removed, DF copying is permitted.

11. INSTALLATION PROCEDURE (for Machine Code: A048)

11.1 ACCESSORY CHECK

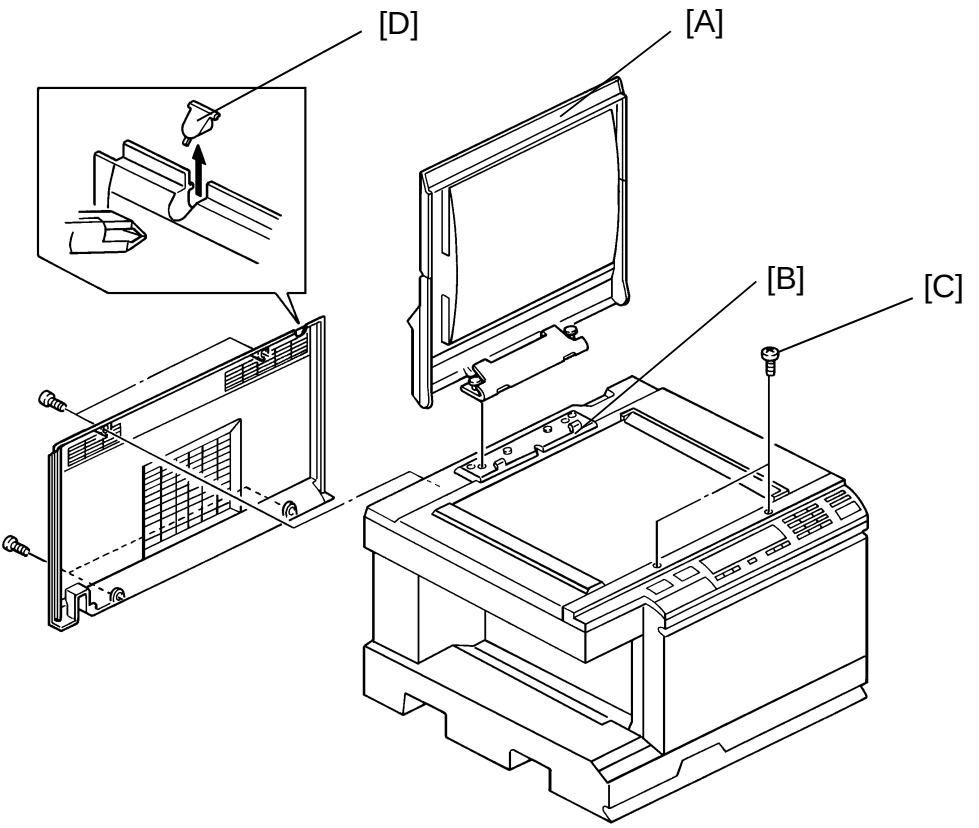
Check the quantity and condition of the accessories in the box according to the following list:

1. Original Table 1
2. DF Mounting Bracket 1
3. Angle Stopper 1
4. Lift Switch Actuator 1
5. E Plate 1
6. Spacer - 0.5 mm 6
7. Spacer - 0.2 mm 4
8. DF Harness Bracket 1
9. Bushing 1
10. Toothed Washer 1
11. Grounding Screw - M4 x 6 1
12. Hexagon Head Screw - M4 x 10 4
13. Philips Screw with Flat Washer - M4 x 5 4
14. Philips Pan Head Screw - M4 x 5 (round head) 3
15. Philips Pan Head Screw - M4 x 5 (flat head) 2
16. Philips Pan Head Screw - M3 x 5 1
17. Stud Screw 2
18. DF Test Chart 1

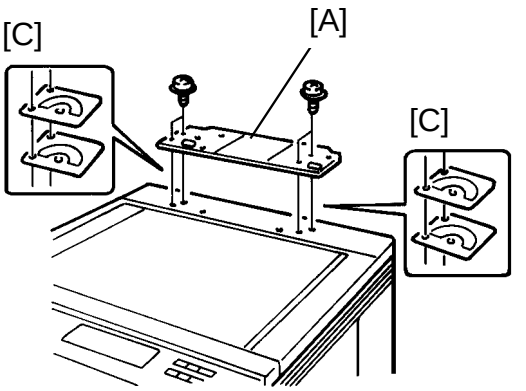
NOTE 1. When the document feeder is installed on the copier, the DC power supply unit (option) is required.

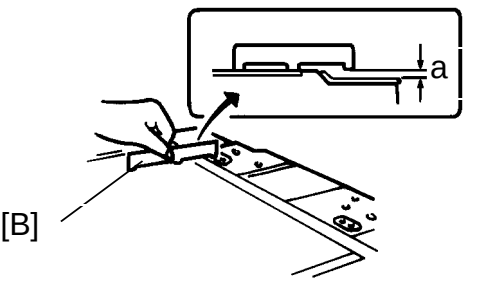
2. When installing the DC power supply unit, please refer to the installation procedure enclosed with it.

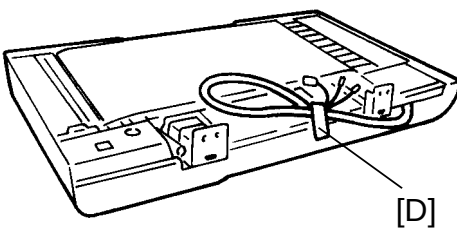
11.2 INSTALLATION PROCEDURE



1. Install the dc power supply unit.
2. Remove the following parts from the copier:
   1) Platen cover [A] (2 push-locks)
   2) Platen cover pedestal [B] (4 screws)
   3) 2 screws [C] for fixing the operation panel.
3. Remove the harness cap [D] on the rear cover with nippers.



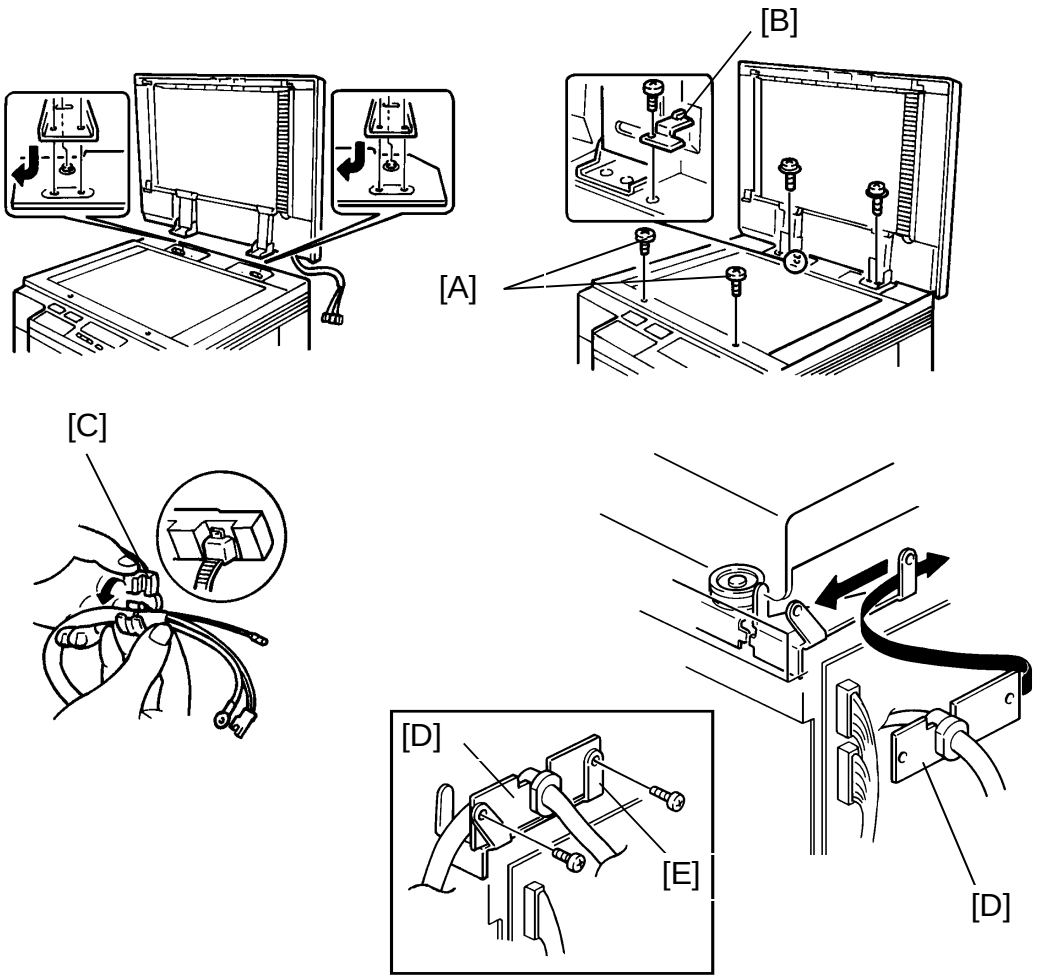




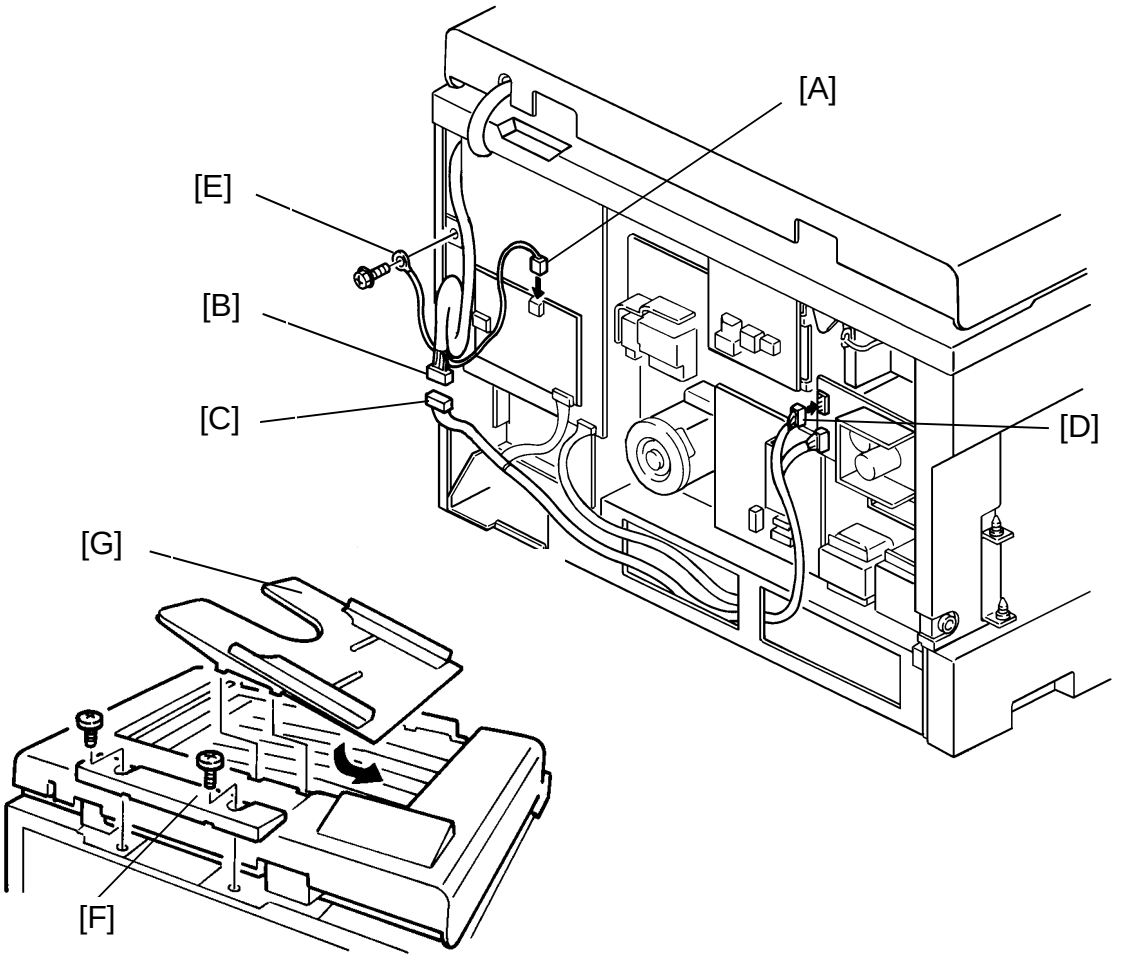
4. Secure the DF mounting bracket [A] (4 screws).

5. Adjust the height of the DF mounting bracket as explained below:
   1) Set the E plate [B] on the exposure glass as shown and measure the clearance "a" between the DF mounting bracket and the E plate with a scale.
   2) Remove the DF mounting bracket and insert spacers [C] until the clearance "a" is between 0 mm and 0.3 mm.

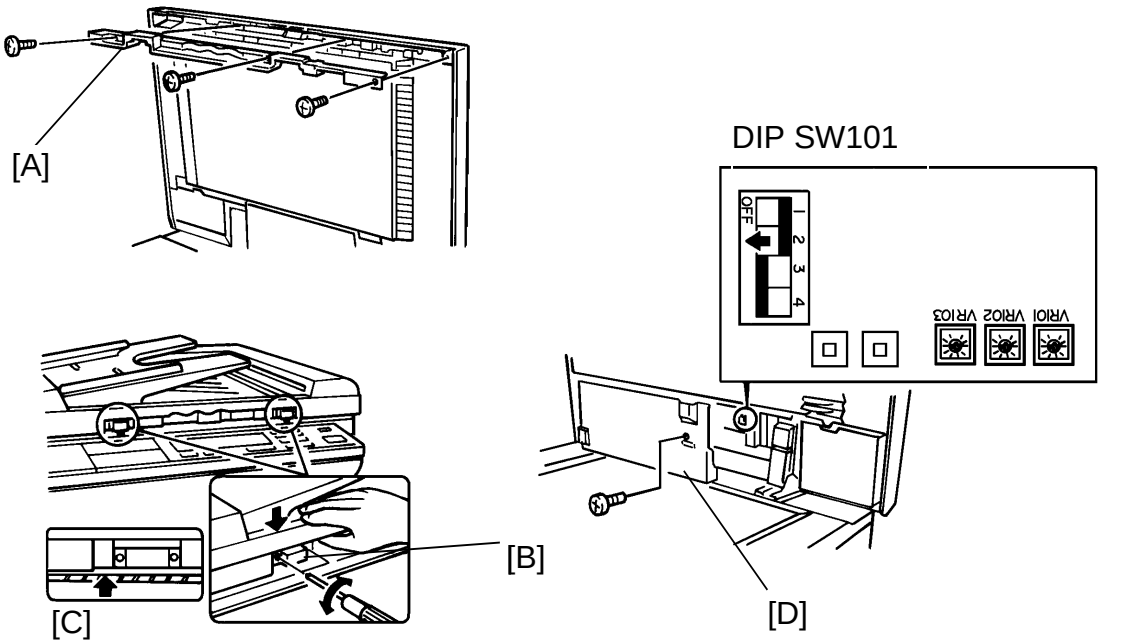
6. Remove the strip of tape [D].



7. Mount the DF on the DF mounting bracket so that the holes in the DF are aligned with the pins on the mounting bracket, then slide the DF to the left as shown.
8. Secure the DF to the DF mounting bracket (4 screws).
9. Secure the 2 stud screws [A] as shown.
10. Install the lift switch actuator [B] (1 screw).
11. Place the bushing [C] on the DF harness as shown in the figure.
12. Place the bushing on the harness bracket [D] and secure the bracket to the harness support bracket [E] (2 screws).



13. Connect the optic cable connector (2P/Black) [A] to CN206 on the interface board.
14. Connect the dc harness (4P/White) [B] to the optional harness connector [C]; then, connect the optional harness connector [D] to CN102 on the dc power supply unit.
15. Secure the grounding wire [E] to the right side plate.
16. Install the angle stopper [F] (2 screws).
17. Install the original table [G].



18. Adjust the height of the magnet catches as follows:
    1) Remove the grip cover [A] (3 screws).
    2) Loosen the screws of the magnet catches [B] (2 screws for each catch).
    3) Close the document feeder and tighten the screws of the magnet catches when the rubber stopper [C] contacts the exposure glass.

19. Remove the DF main PCB cover [D] and turn off DIP switch 101-2.

NOTE: Make sure that DIP switch 101-1 is on and the other switches (101-2, 3, and 4) are off.

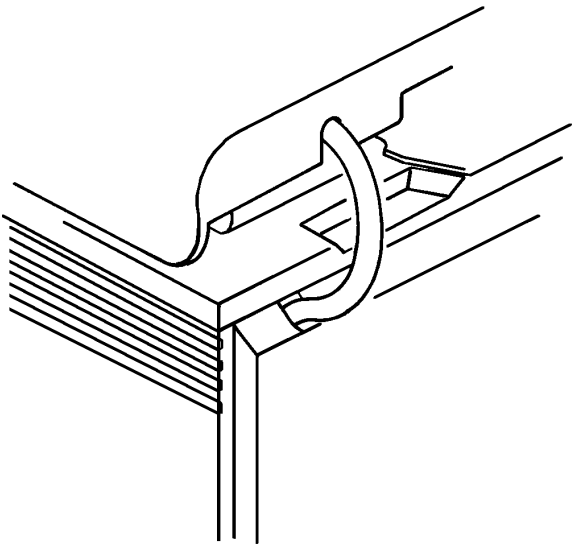
20. Reinstall the grip cover (3 screws).

NOTE: Open and close the document feeder to confirm that the magnet catches are making good contact.

21. Plug in the copier and turn on the main switch.

22. Confirm the original registration as follows:
    1) Make a copy of the test sheet in platen mode (A4 width).
    2) Confirm that the original select switch is set to thin paper mode and make a copy in DF mode (A4 width).
    3) Compare the registration of the copy in platen mode with that of DF mode, and confirm that the difference is within 2.5 mm.
    4) If the difference is more than 2.5 mm, remove the DF main PCB cover and adjust VR102 to change the original-stop timing.

NOTE: Turning VR102 clockwise results in the original stopping later.



5) Make a copy of the test sheet in DF two-sided original mode.

NOTE: 1. The test sheet must be set facedown.

2. The original select switch can be set at any position.

6) Compare the registration of the copy in platen mode with that of DF two-sided original mode, and confirm that the difference is within 2.0 mm.

7) If the difference is more than 2.0 mm, remove the DF main PCB cover and adjust VR103 to change the original-stop timing.

NOTE: 1. The test sheet should stop pressed against the left scale in DF two-sided original mode.

2. Turning VR103 clockwise results in the original stopping later.

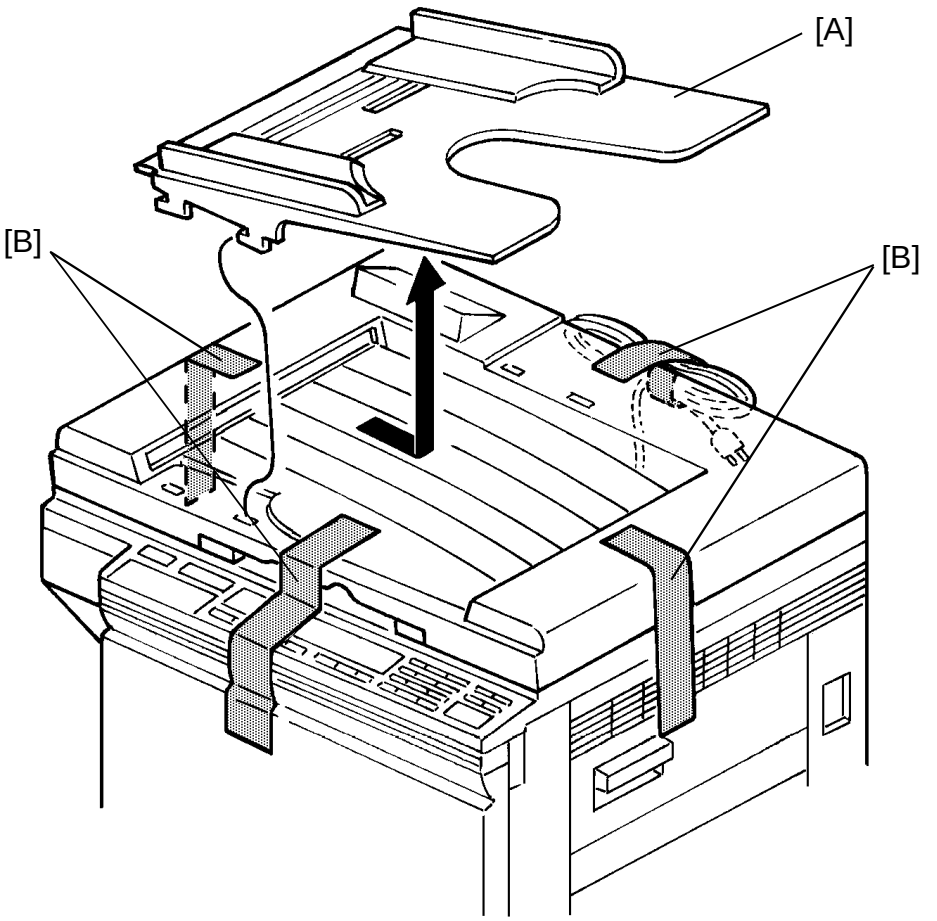
23. Reassemble the copier. (The DF harness fits in the cut-out on the rear cover as shown.)

24. Check the operation of the DF.

25. Position the original select switch to thin original mode (normal position) and explain the function of this switch to the customer.

12. PREPARATION FOR TRANSPORTATION

CAUTION: Before moving the document feeder, be sure to prepare it for transportation as follows. The document feeder may be badly damaged if it is moved without proper preparation.

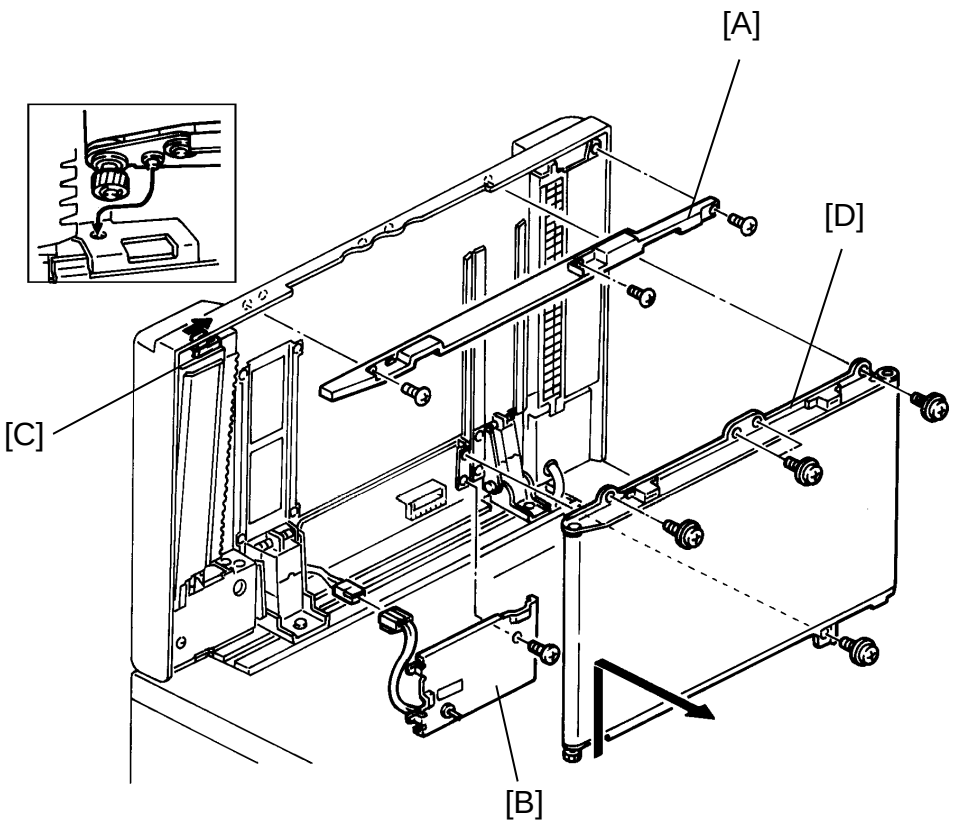


1. Remove the original table [A].
2. Secure the document feeder with strips of tape [B] as shown in the illustration.

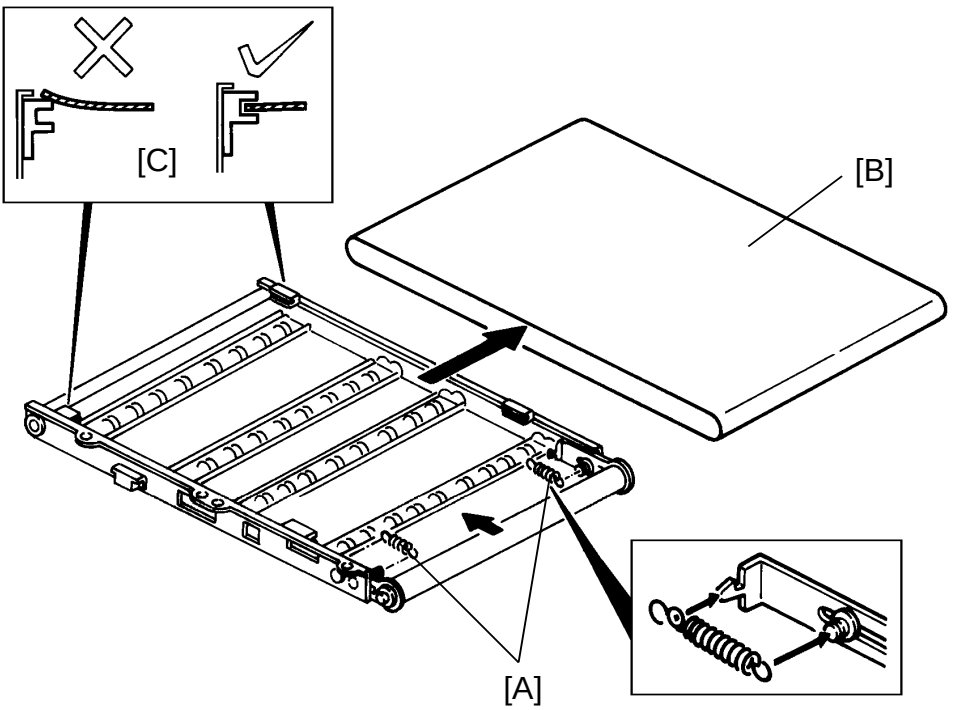
13. REPLACEMENT AND ADJUSTMENT

13.1 FEED-IN UNIT

13.1.1 Transport Belt Replacement



1. Turn off the main switch and remove the grip [A] (3 screws).
2. Remove the DF main PCB cover [B] (1 screw, 1 connector).
3. Open the entrance guide [C] and remove the transport belt assembly [D] (5 screws).

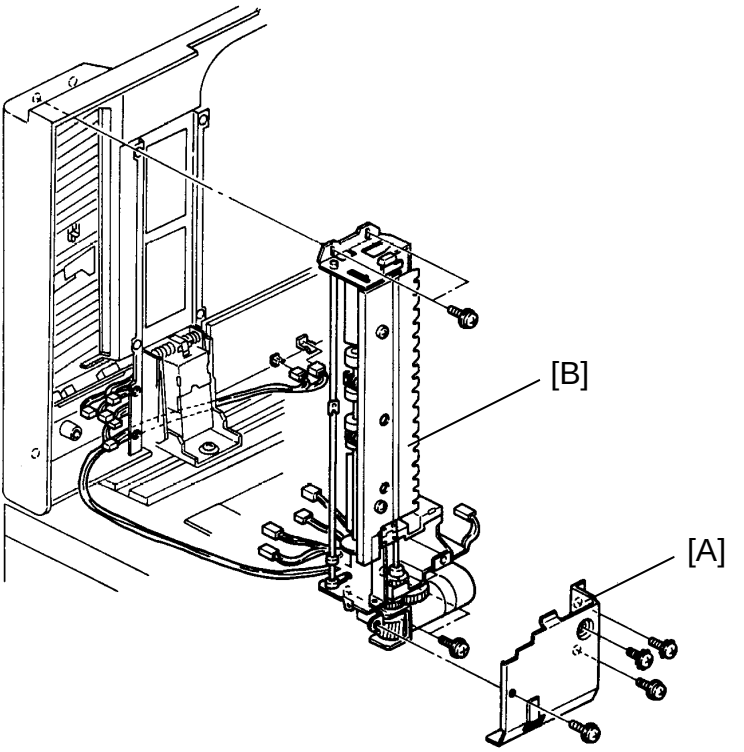


4. Remove the 2 tension springs [A] and pull off the transport belt [B].

NOTE: a) When installing the transport belt, make sure the belt lies between the belt guide spacers [C].

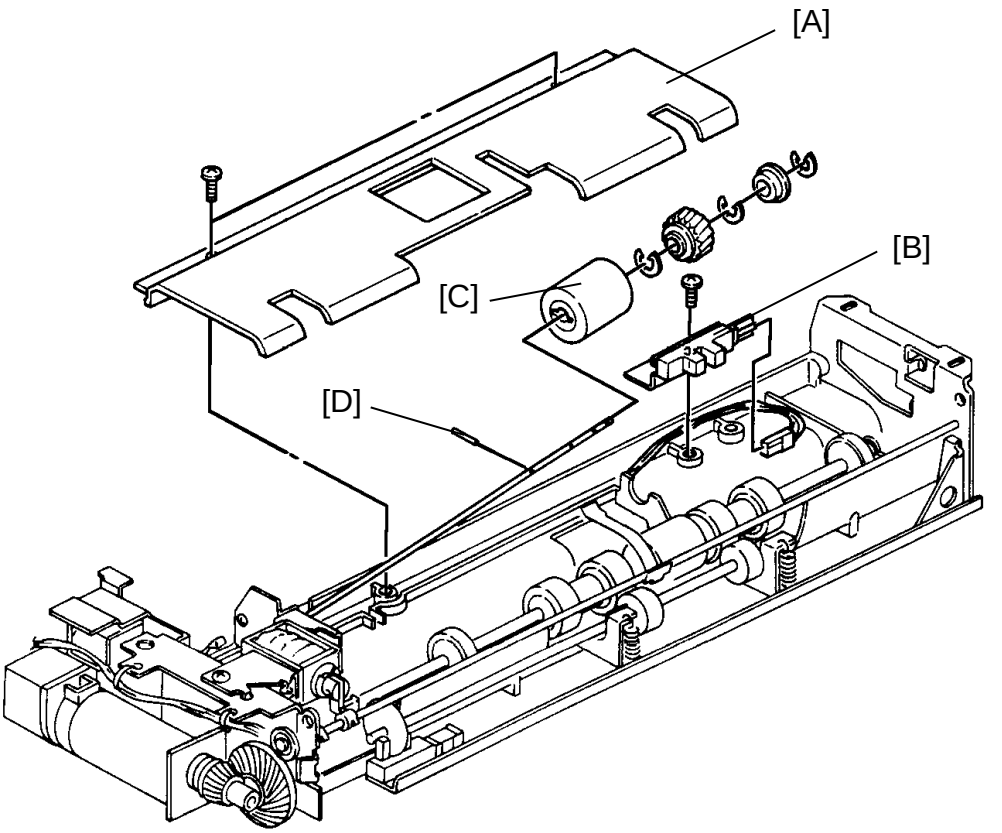
b) When installing the transport belt assembly, make sure the positioning pin correctly fits in the DF frame, and hold open the exit guide to prevent the mylar strip from becoming damaged.

13.1.2 Feed-in Unit Removal



1. Turn off the main switch.
2. Remove the transport belt assembly. (See Transport Belt Replacement.)
3. Remove the belt drive motor cover [A] (4 screws).
4. Remove the feed-in unit [B] (4 screws, 8 connectors).

13.1.3 Pick-up Roller Replacement*



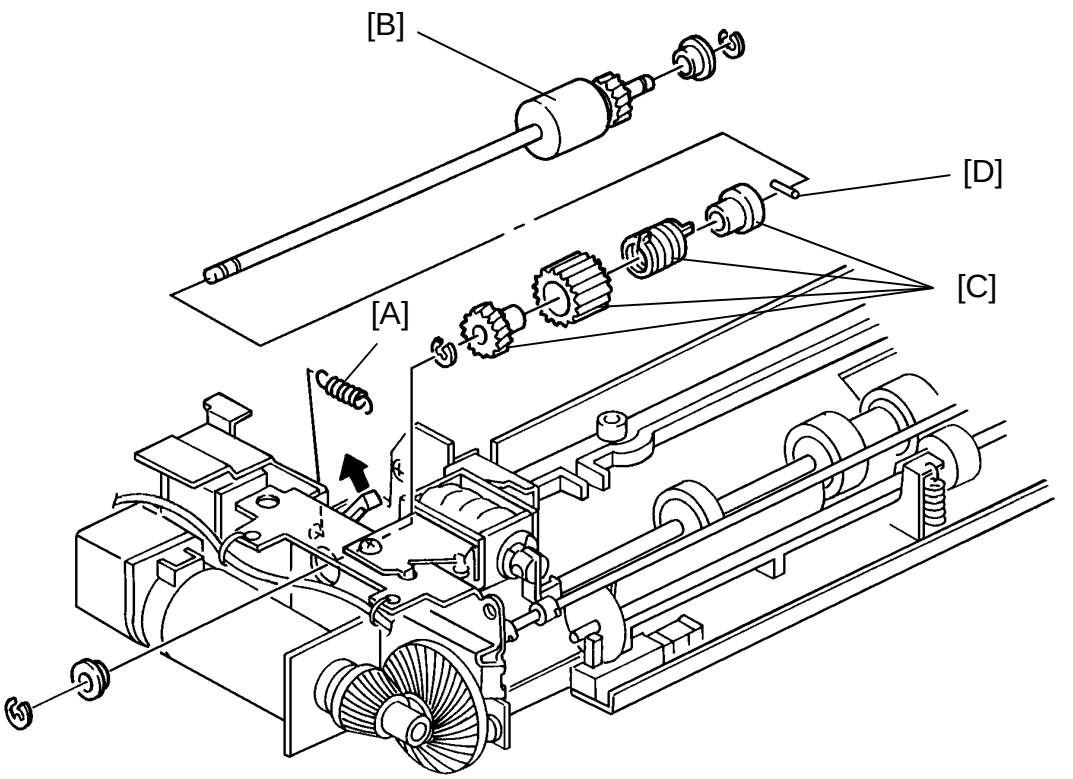
1. Turn off the main switch.
2. Remove the feed-in unit. (See Feed-in Unit Removal.)
3. Remove the lower entrance guide [A] (2 screws).
4. Remove the original set sensor assembly [B] (1 screw, 1 connector).
5. Remove the pick-up roller [C] (3 E-rings, 1 bushing, 1 gear).

NOTE: a) Be careful not to loose the pin [D].

b) When installing the roller, make sure the positioning pin is correctly inserted in the cut-out of the roller.

c) When installing the gear, make sure the flat side of the gear is facing away from the roller.

13.1.4 Feed-in Clutch Lubrication

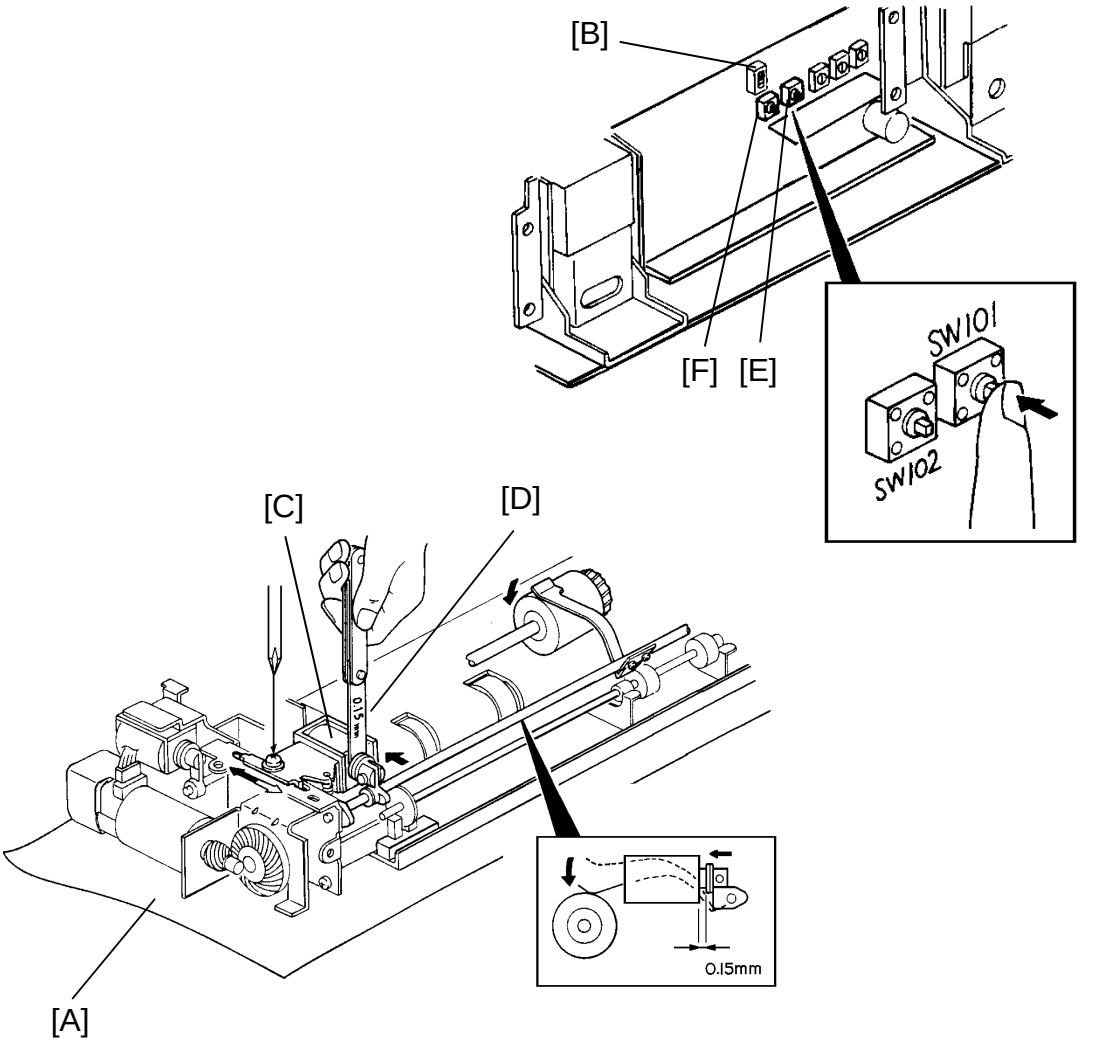


1. Turn off the main switch.
2. Remove the original set sensor assembly. (See Pick-up Roller Replacement.)
3. Remove the feed-in solenoid lever spring [A].
4. Remove the pick-up roller assembly [B] (2 E-rings, 2 bushings).
5. Disassemble and lubricate the feed clutch [C] (1 E-ring) with Mobil Temp. 78.

NOTE: a) Be careful not to loose the pin [D].

b) When installing the feed clutch, make sure the positioning pin is correctly inserted in the cut-out of the clutch.

13.1.5 Pick-up Solenoid Adjustment



1. Turn off the main switch.
2. Place several sheets of paper [A] over the exposure glass area.
3. Lower the feed-in unit (See Feed-in Unit Removal) without disconnecting the eight connectors.
4. Turn on the main switch.

NOTE: When the main switch is turned on, the DPS101 setting on the DF main PCB must be as follows:

1 = ON 3 = OFF
2 = ON 4 = OFF

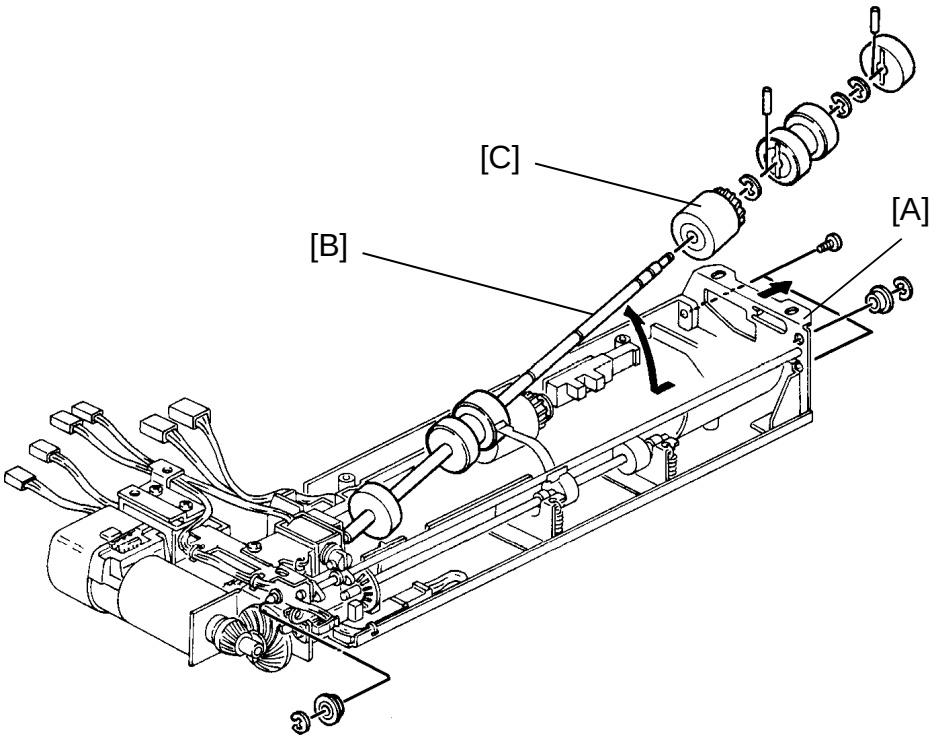
This is so that the initial check sequence can take place.

5. Turn off DPS101-1 and 2, then turn on DPS101-3 and 4 [B].
6. Loosen the screw fixing the pick-up solenoid [C].
7. Place the 0.15 mm thickness gauge [D] between the plunger and the solenoid.
8 While holding the solenoid, press SW101 [E] on the DF main PCB to engage all DF solenoids.
9. Holding the solenoid securely, move it slowly towards the left, until the plunger is attracted to the solenoid. Just at this point, tighten the screw.

NOTE: Make sure the pick-up lever is touching the pick-up roller during this adjustment.

10. Press SW 102 [F] to turn off the solenoids.
11. Turn off DPS101-3 and 4, then turn on DPS101-1 and 2.
12. Turn off the main switch and reassemble the DF.
13. Check the original feed-in operation.

13.1.6 Feed Roller Replacement -



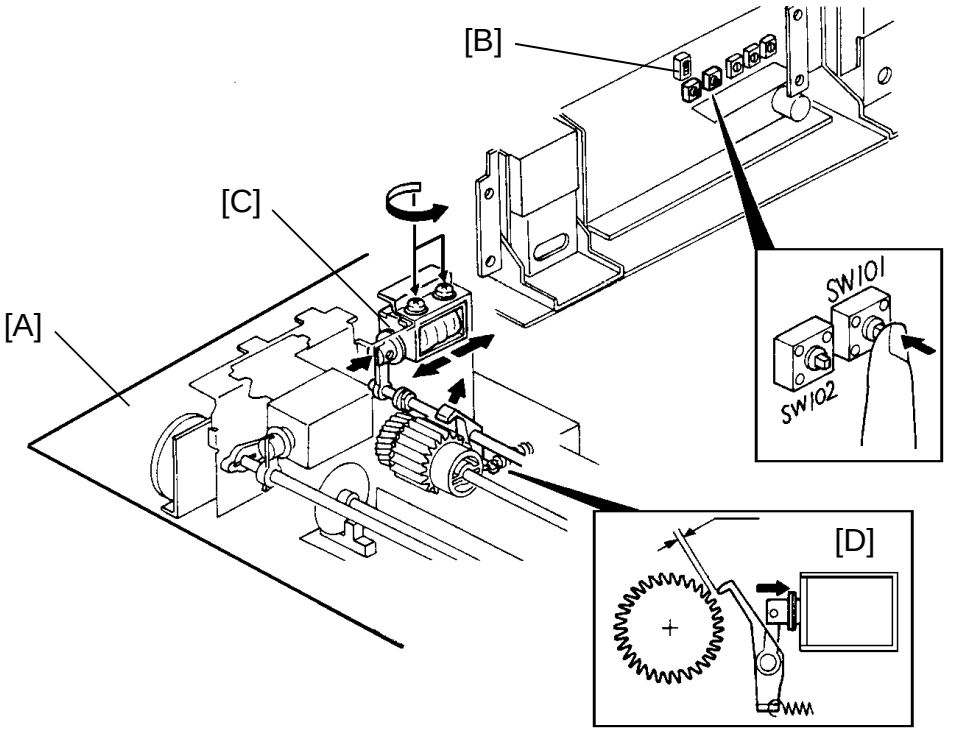
1. Turn off the main switch.
2. Remove the lower entrance guide. (See Pick-up Roller Replacement.)
3. Loosen the front bracket [A] (2 screws).
4. Release the feed roller shaft [B] from the front bracket (1 E-ring, 1 bearing).
5. Remove the feed roller [C] (3 E-rings, 1 side roller, 1 pull-out roller).

NOTE: a) Take care not to lose the pins.

b) When installing the feed roller, make sure the gear side of the roller faces the front (See illustration).

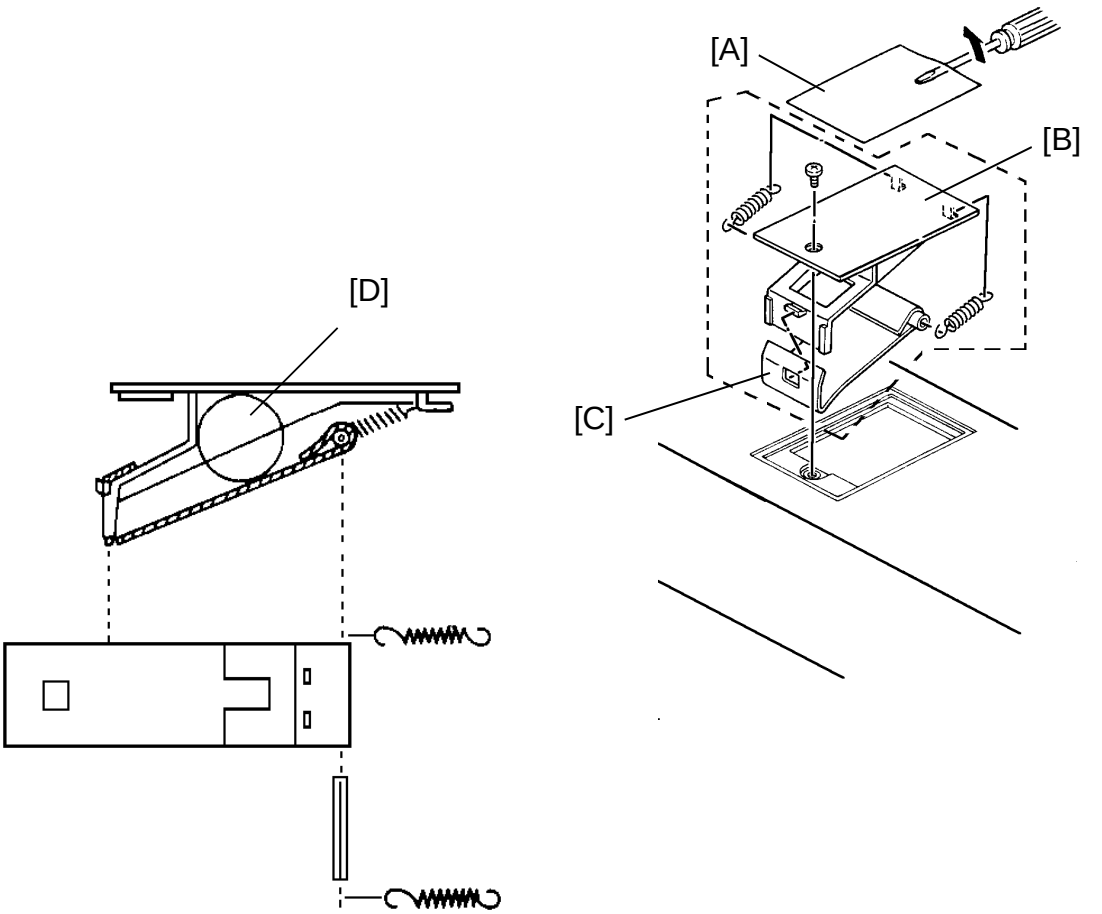
c) When installing the side and pull-out rollers, make sure the pins are correctly inserted in the cut-outs of the rollers.

13.1.7 Feed-in Solenoid Adjustment



1. Turn off the main switch.
2. Place several sheets of paper [A] over the exposure glass area.
3. Lower the feed-in unit (See Feed-in Unit Removal) without disconnecting the eight connectors.
4. Check that DPS101 is set for the normal mode (1 = ON, 2 = ON, 3 = OFF, 4 = OFF).
5. Turn on the main switch.
6. Turn off DPS101-1 and 2, then turn on DPS101-3 and 4 [B].
7. Loosen the 2 screws securing the feed-in solenoid [C].
8. Press SW101 on the DF main PCB (to engage all DF solenoids) and adjust the position of the solenoid until the gap [D] (See illustration) is within 1.0 – 2.0 mm.
9. Press SW102 on the DF main PCB to turn off all DF solenoids.
10. Turn off DPS101-3 and 4, then turn on DPS101-1 and 2.

13.1.8 Friction Belt Replacement



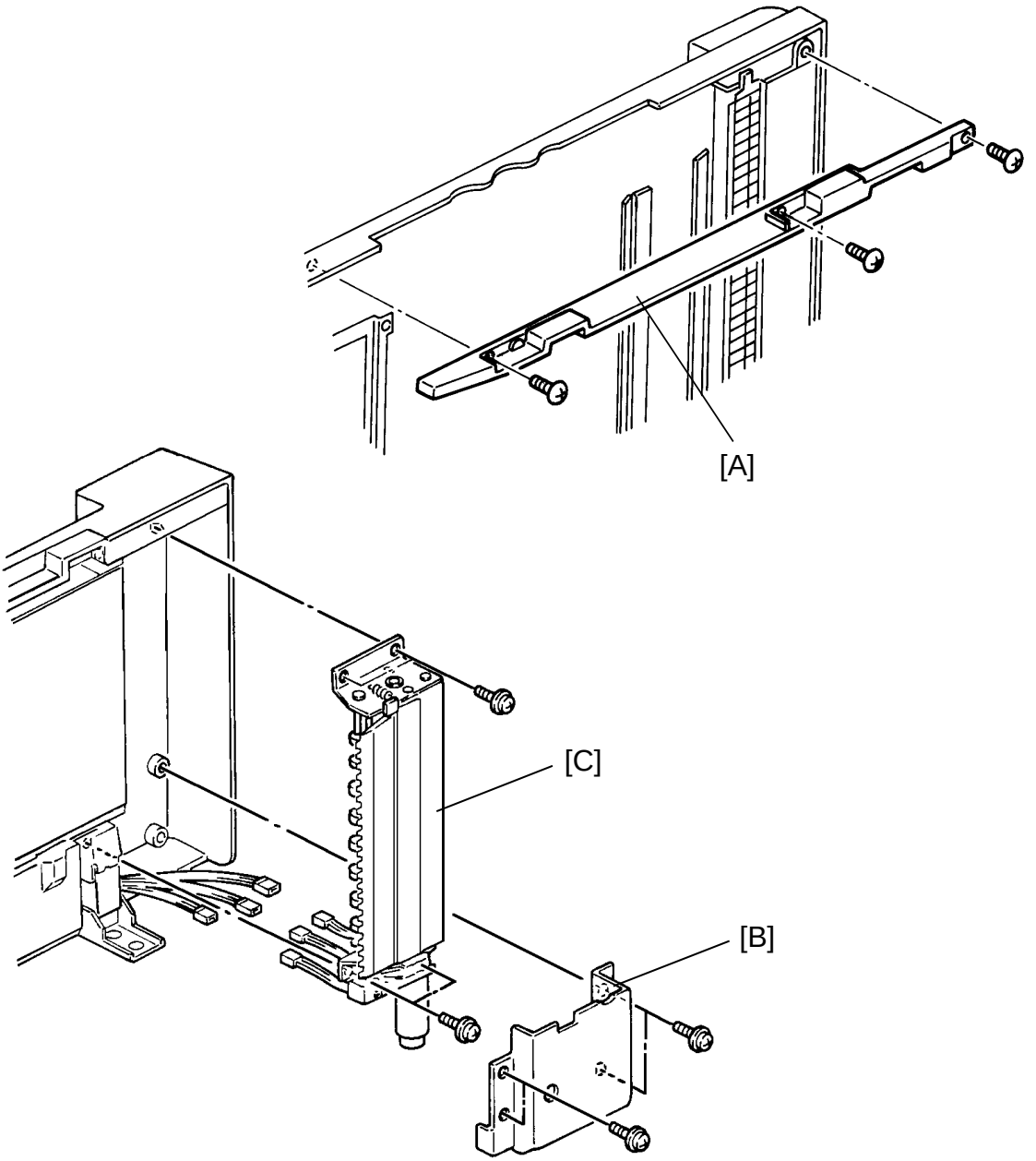
1. Turn off the main switch.
2. Remove the seal cover [A] on top of the DF cover.
3. Remove the friction belt assembly [B] (1 screw).
4. Remove the friction belt [C] (2 springs, 1 pin).

NOTE: a) When installing the friction belt assembly, make sure the friction roller [D] is set in the correct position (See illustration).

b) If the seal cover becomes dirty or deformed, replace it with a new one.

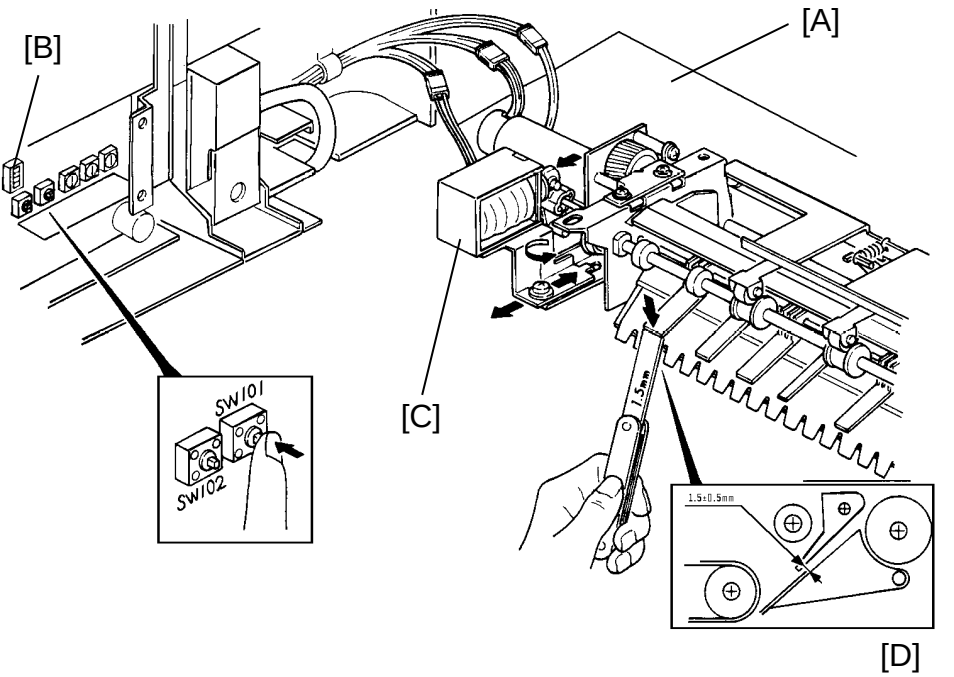
13.2 FEED-OUT UNIT

13.2.1 Feed-out Unit Removal



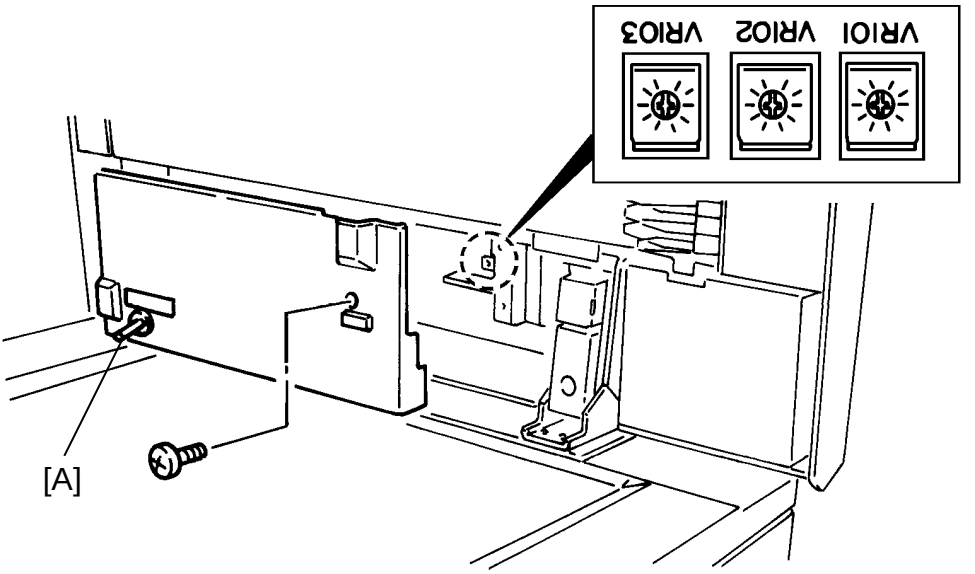
1. Turn off the main switch.
2. Remove the DF grip [A] (3 screws).
3. Remove the feed-out motor cover [B] (4 screws).
4. Remove the feed-out unit [C] (4 screws, 3 connectors).

13.2.2 Inverter Solenoid Adjustment



1. Turn off the main switch.
2. Place several sheets of paper [A] over the exposure glass area.
3. Lower the feed-out unit (See Feed-out Unit Removal) without disconnecting the three connectors.
4. Check that the DPS101 is set for the normal mode (1 = ON, 2 = ON, 3 = OFF, 4 = OFF).
5. Turn on the main switch.
6. Turn off DPS101-1 and 2, then turn on DPS101-3 and 4 [B].
7. Loosen the screw securing the inverter solenoid [C].
8. Press SW101 on the DF main PCB (to engage all DF solenoids), and adjust the position of the solenoid until the gap [D] (See illustration) is within 1.5 ±0.5 mm.
9. Press SW102 on the DF main PCB to turn off all DF solenoids.
10. Turn off DPS101-3 and 4, then turn on DPS101-1 and 2.

13.2.3 DF Leading Edge Registration Adjustment



1. Using the DF test chart, make a copy in the platen cover mode (A4 width).
2. Confirm that the original select switch [A] is in the thin mode and again using the test chart, make a copy in the DF mode (A4 width).
3. Compare the leading edge registration of both copies, and check that the difference between the two copies is within 2.5 mm.

4. If the difference is more than 2.5 mm, remove the DF main PCB cover (1 screw) and adjust VR102 on the DF main PCB until the leading edge registration is within specification.

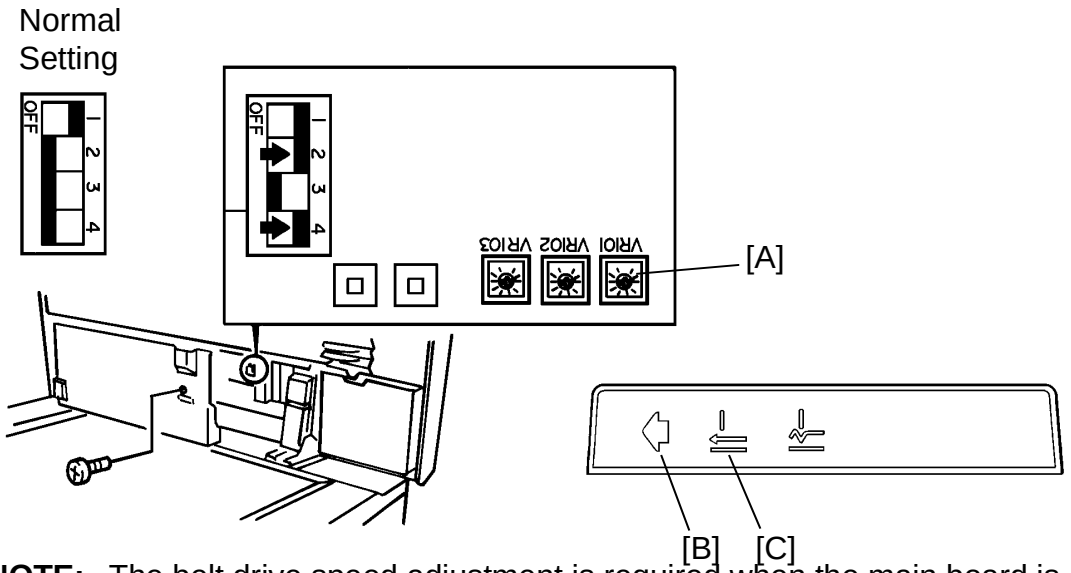
NOTE: Turning VR102 clockwise results in stopping the original later.

5. Using the DF test chart, make a copy in the DF two sided-original mode. (Insert the original face down.)
6. Compare the leading edge registration with that of the platen cover mode copy, and check that the difference between the two copies is within 2.00 mm.
7. If out of specification, adjust VR103 on the DF main PCB until the leading edge registration is correct.

NOTE: a) The test sheet stops pressed against the left scale in DF two-sided original mode.

b) Turning VR103 clockwise results in the original stopping later.

13.3 BELT DRIVE MOTOR SPEED ADJUSTMENT



NOTE: The belt drive speed adjustment is required when the main board is replaced.

1. Turn off the main switch.
2. Check that DIP switch 101 is set for the normal setting as follows:

101-1	101-2	101-3	101-4
ON	OFF	OFF	OFF

3. Turn on the main switch and DIP switch 101-2 and -4.
4. While turning on the lift switch manually, adjust the belt drive motor speed using VR 101 [A] so that both the Insert Original indicator [B] and Auto Feed indicator [C] turn off.

NOTE: a) When the Insert Original indicator lights, turn VR 101 clockwise to reduce the motor speed.

b) When the Auto Feed indicator lights, turn VR 101 counterclockwise to increase the motor speed.

c) Confirm that both indicators remain off for approximately 5 seconds in order to stabilize the motor speed.

5. Turn off DIP switch 101-2 and -4.

NOTE: Do not use VR 106. This variable resistor is for adjusting feed-out motor speed. This is preset by the vendor.

SECTION 9

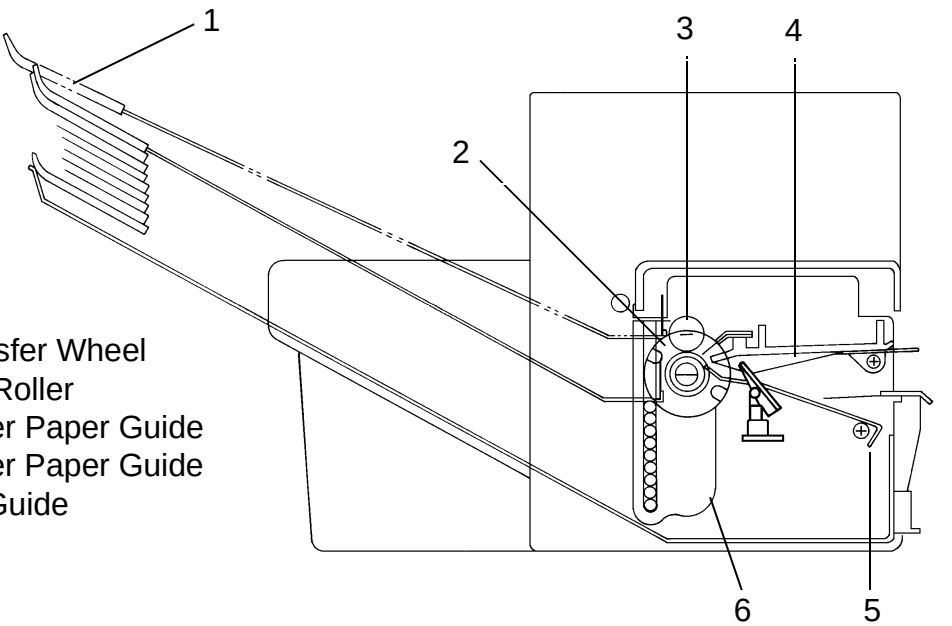
SORTER

1. SPECIFICATIONS

Number of Bins:	10 bins	
Paper Size for Bins:	Maximum Minimum	A3, 11" x 17" A6, 5 1/2" x 8 1/2" (Lengthwise)
Paper Weight:	64 to 90 g/m2 (17 to 24 lb)	
Bin Capacity:	Sort/Stack Mode	20 sheets / A4, 8 1/2" x11" 15 sheets / B4, 8 1/2" x 14" 10 sheets / A3, 11" x 17"
Top Bin Capacity: (Non-Sort/Stack Mode)	100 sheets (all sizes)	
Power Source:	+5 volts and +24 volts from the copier	
Power Consumption:	7.7 W	
Dimensions: (W x D x H)	440 mm x 391 mm x 367 mm (17.3" x 15.4" x 14.4")	
Weight:	7.5 kg (16.5 lb).	

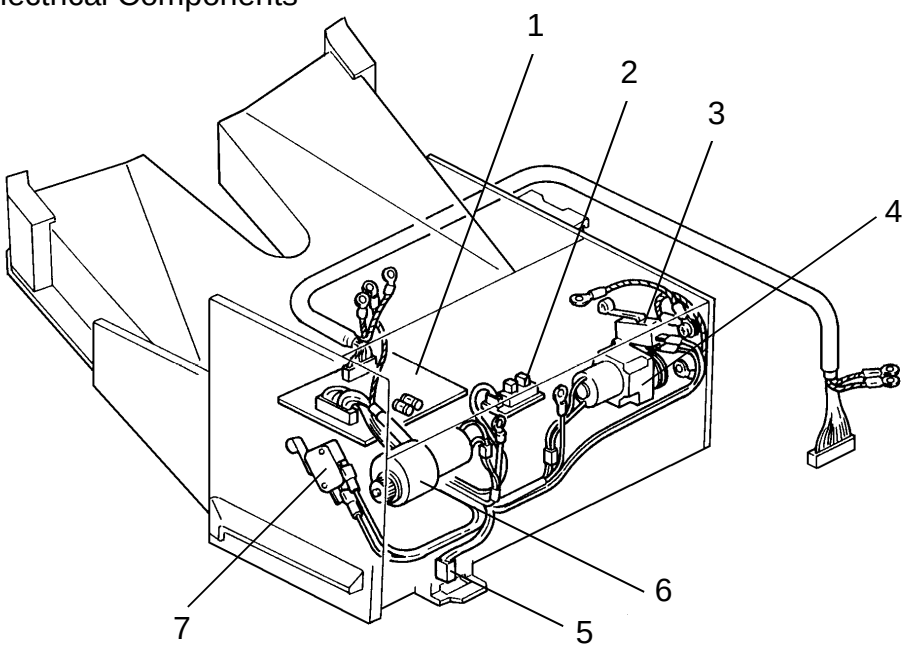
2. COMPONENT LAYOUT

— Mechanical Components —



1. Bin
2. Transfer Wheel
3. Exit Roller
4. Upper Paper Guide
5. Lower Paper Guide
6. Bin Guide

— Electrical Components —

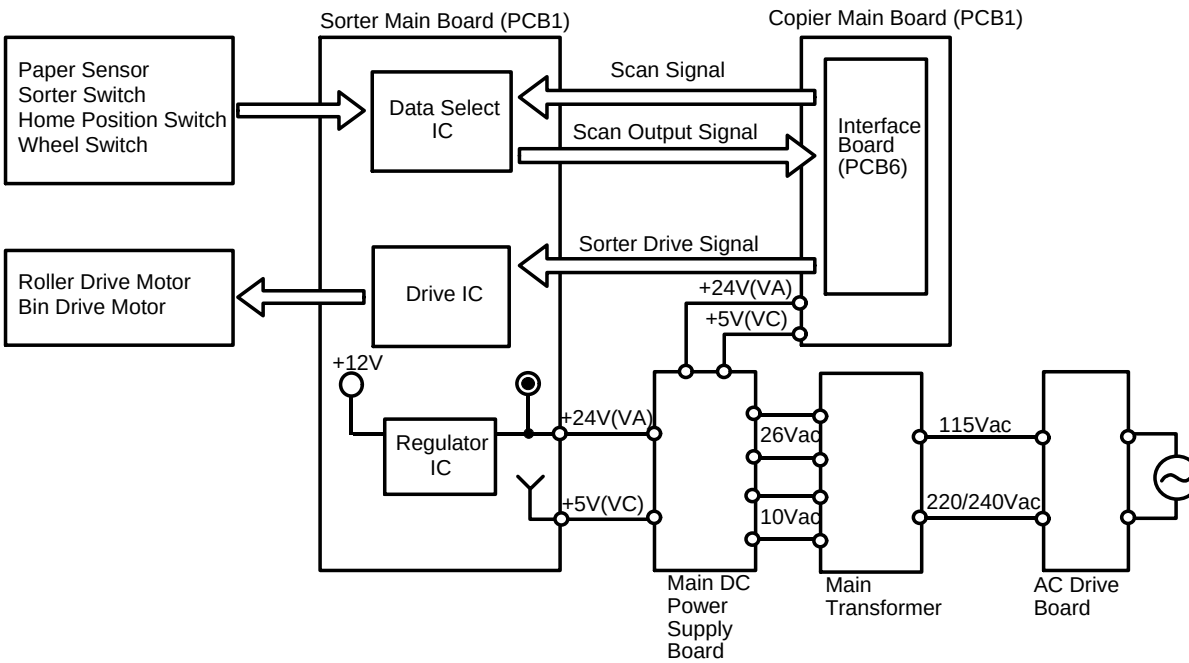


1. Sorter Main Board
2. Paper Sensor
3. Wheel Switch
4. Roller Drive Motor
5. Sorter Switch
6. Bin Drive Motor
7. Home Position Switch

3. ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function	Location
Motors			
M1	Roller Drive Motor	DC motor that energizes to drive the lower exit rollers.	4
M2	Bin Drive Motor	Reversible DC motor that energizes to move the bins up or down.	6
Switches			
SW1	Wheel Switch	Detects the rotation of the transfer wheel and stops it in the correct position.	3
SW2	Sorter Switch	Reed switch that becomes activated when the sorter is in the proper position (aligned next to the copier). Also works as a jam reset switch for the sorter.	5
SW3	Home Position Switch	Informs the CPU that all the bins are lowered.	7
Sensors			
S1	Paper Sensor	Serves as the misfeed sensor for the sorter and also sets exit roller and bin drive timing.	2
Printed Circuit Boards			
PCB1	Sorter Main Board	Serves as the communication board between the copier main board and the sorter.	1

4. OVERALL MACHINE CONTROL



The main DC power supply board provides +24 volts (VA) and +5 volts (VC) to the sorter main board. +24 volts powers the roller drive motor, and +5 volts powers all sensors and switches. Also, +24 volts is changed to +12 volts by the regulator IC, which powers the bin drive motor.

The copier main board controls the drive and checks the status of the sorter via the sorter main board and the interface board. The interface board sends the scan signals to the data selected IC on the main board according to the signal from the copier main board. After receiving the scan signals, the data select IC outputs the status of the sensor and switches as the scan output signal.

The interface board also sends the sorter drive signal to the drive IC on the sorter main board according to the signal from the copier main board. After receiving the drive signal, the drive IC turns on the appropriate motors.

5. BASIC OPERATION

- Clear Mode -

When the main switch of the copier is turned on, the sorter automatically assumes the clear mode. In this mode, all copies are stacked on the first bin. The sorter also assumes the clear mode when either the interrupt mode or the manual feed mode is selected.

Sorter operation begins when a copy actuates the copier exit sensor. At this time, the roller drive motor energizes. When the paper exits onto the sorter bin, the paper sensor is de-activated and the roller drive motor is then de-energized. The copier main board monitors the paper sensor through the sorter main board to check for paper misfeeds.

- Sort Mode -

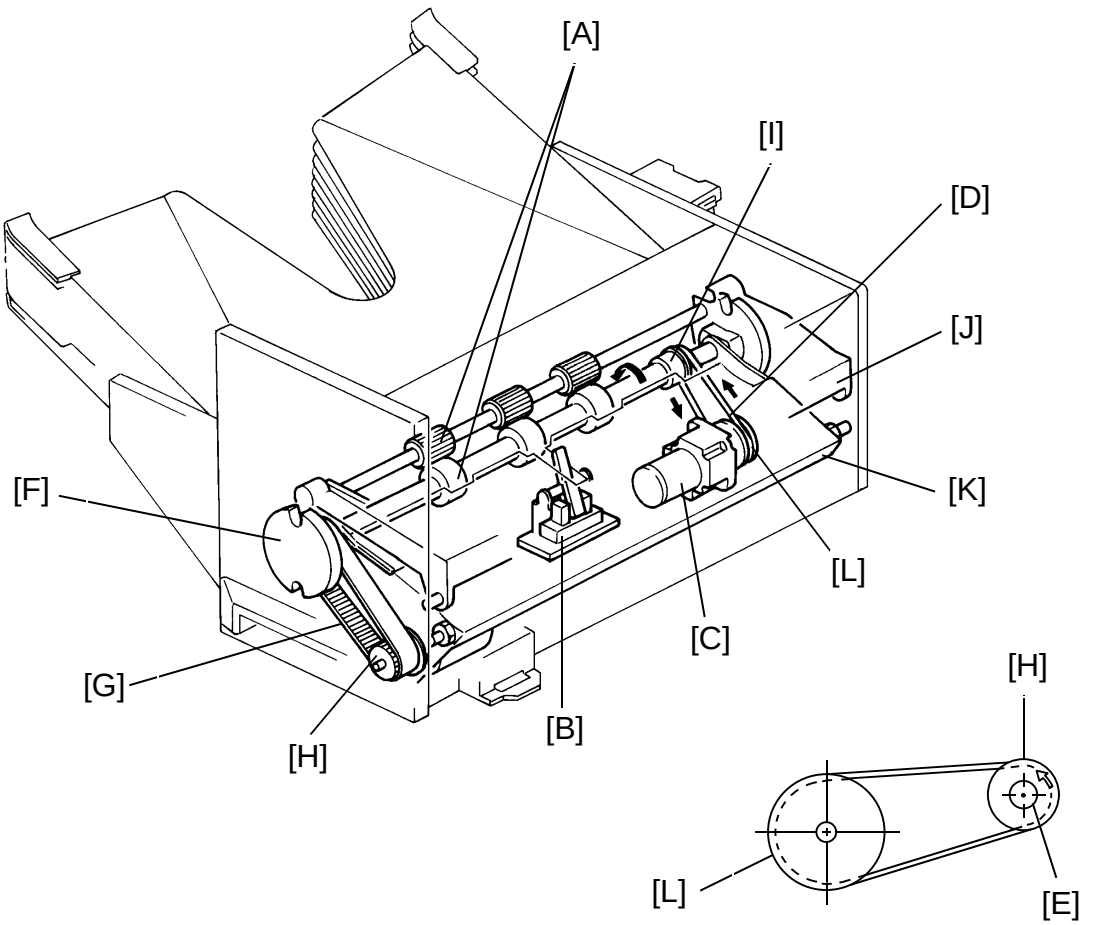
Pressing the Sorter key once shifts the copier to the sort mode. In this mode, all copies of the first original are delivered to separate bins starting from the top. The copies of the second original are delivered to the same bins, but starting from the bottom. The copies of the third original start from the top and so on. The bin drive motor turns on to advance the bin one step, 250 milliseconds after the copy has gone through the paper sensor. If the Copy Quantity, Clear/Stop, Book Copy, or Sorter key is pressed during the sort mode, all bins shift to the home position.

- Stack Mode -

Pressing the Sorter key twice shifts the copier to the stack mode. In this mode, all copies of the first original are delivered to the first bin, all copies of the second original are delivered to the second bin, and so on. The bin drive motor turns on to advance the bin one step, 250 milliseconds after the last copy of the original has gone through the paper sensor. If the Sorter key is pressed during stack mode, all bins shift to home position.

6. EXIT ROLLER DRIVE

6.1 ROLLER DRIVE MECHANISM

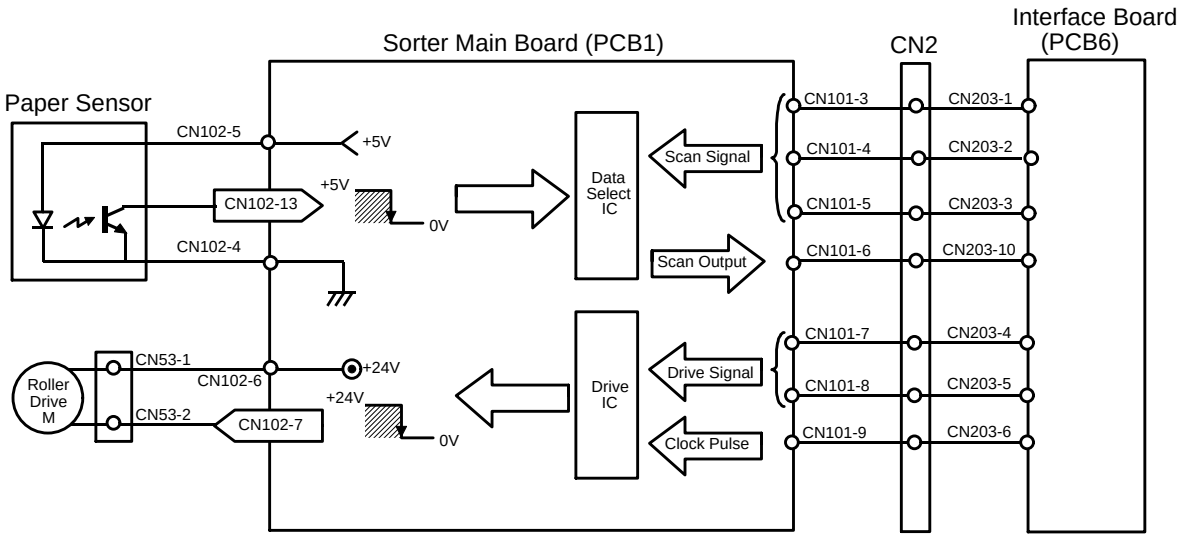


F:	Transfer Wheel
G:	Bin Drive Belt
H:	Bin Drive Pulley
I:	Exit Roller Pulley
J:	Upper Paper Guide
K:	Lower Paper Guide
L:	Roller Drive Motor Pulley

The exit rollers [A] take over paper transport from the copier. When the copy paper actuates the copier exit sensor, the exit rollers start rotating. The exit rollers continue to rotate for 250 milliseconds after the copy paper has gone through the paper sensor [B].

The roller drive motor [C] rotates the lower exit roller via the roller drive belt [D]. The shaft of the lower exit roller is a cylindrical cavity type which rotates around the transfer wheel shaft [E]. The paper sensor is positioned just in front of the exit rollers. The paper sensor detects misfeeds in the sorter.

6.2 ROLLER DRIVE CIRCUIT

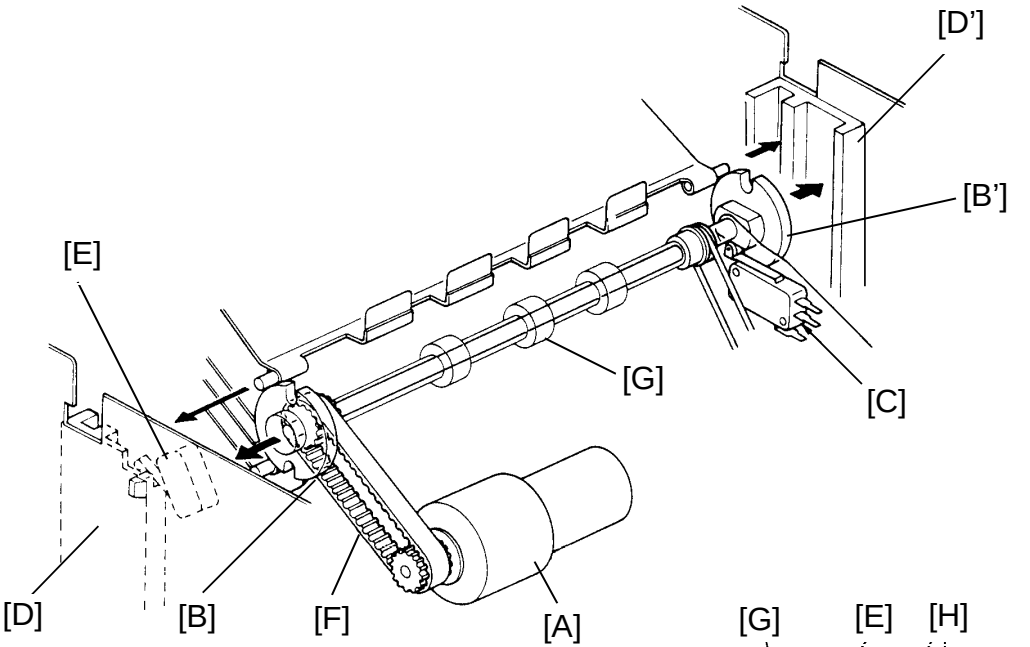


To turn on the roller drive motor, the interface board sends a drive signal to the drive IC on the sorter main board. After receiving the drive signal, the drive IC drops CN102-7 from +24 to 0 volt to turn on the roller drive motor.

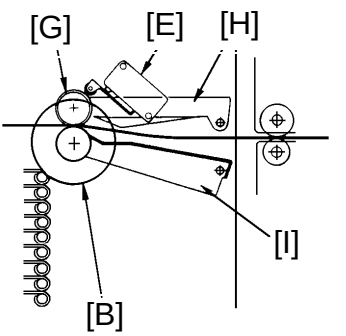
When the paper sensor is actuated, CN102-13 drops to LOW. The interface board outputs three scan signals to the data select IC. The status of the sensor changes the resulting scan output signal. Using the scan output signal, the copier main board determines the status of the sensor. For safety reasons, the CPU limits the operation time of the roller drive motor to 5 seconds.

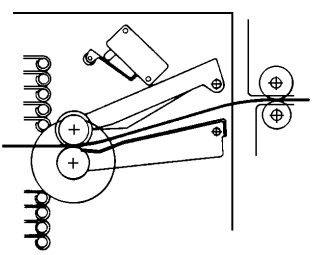
7. BIN DRIVE

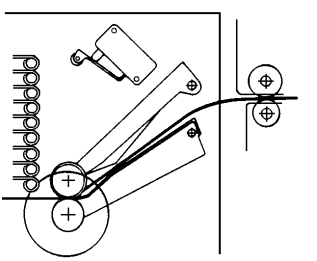
7.1 BIN DRIVE MECHANISM



G : Exit Roller
H : Upper Paper Guide
I : Lower Paper Guide







The bin drive mechanism moves the bins up and down to receive copies under the direction of the copier CPU. The main components in this mechanism are the bin drive motor [A], two transfer wheels [B,B'], the wheel switch [C], and the bins themselves.

Pins on either side of each bin are inserted into slots called bin guides [D,D']. The bins slide up and down in the bin guides. The bins sit on each other with the lower bin resting on the permanently-mounted 10th bin. The upper and lower paper guides pivot up and down depending on the height of the bin to be picked up or released.

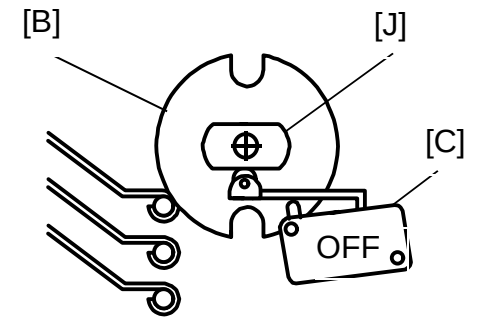
The home position switch [E] informs the CPU when all the bins are lowered.

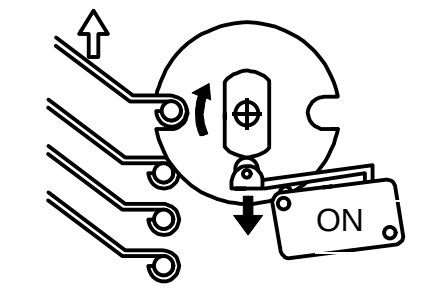
To move the bins up, the bin drive motor turns clockwise (as viewed from the front). A timing belt [F] turns the transfer wheels.

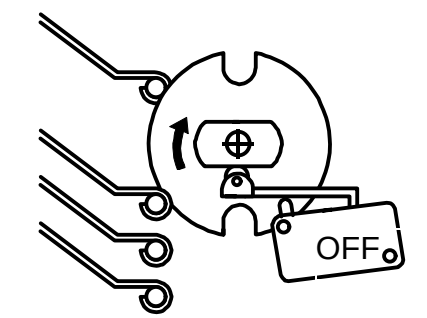
The transfer wheels have two slots in them 180 degrees apart. As the transfer wheels turn, these slots engage the bins and lift them up. Each time the transfer wheels turn 180 degrees, they raise one bin.

To move the bins down, the CPU reverses the bin drive motor and the above processes reverses.

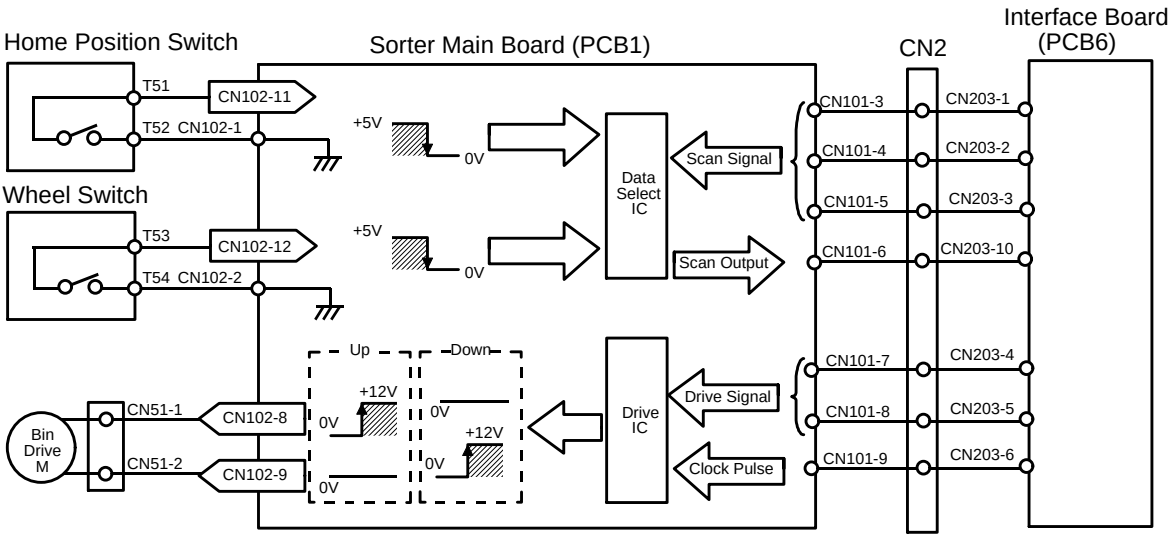
The CPU monitors the position of the bins through pulses generated by the wheel switch and the actuator cam [J]. The actuator cam has two flat sides that are 180 degrees apart and is mounted behind the rear transfer wheel. A pulse is generated each time one of the lobes of the actuator cam passes the wheel switch.







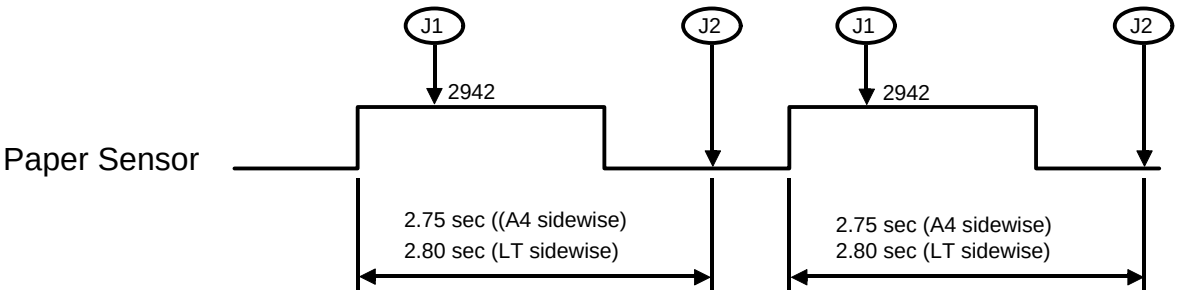
7.2 BIN DRIVE CIRCUIT



To turn on the bin drive motor, the interface board sends drive signals to the drive IC on the sorter main board. After receiving the drive signals, the drive IC either raises CN102-8 or CN102-9 to +12 volts. This turns on the bin drive motor which respectively moves a bin up or down. The main board monitors the output of both sorter switches through the data select IC through the interface board. When either the home position switch or wheel switch is actuated, CN102-11 or CN102-12 drops to LOW. The interface board outputs three scan signals to the data select IC. The status of the switches changes the resulting scan output signal. Using the scan output signal, the copier main board determines the status of the switch.

The CPU monitors the on-time of the bin drive motor to detect a malfunction of the bin drive motor. If the bin drive motor continues to rotate more than twelve seconds, the CPU stops machine operation.

8. MISFEED DETECTION



In addition to being used for the exit roller and bin drive timing, the paper sensor checks for a misfeed in the sorter. The copier CPU checks whether the paper sensor is actuated within 942 pulses (3.8 seconds) after the registration clutch turns on (at 2,000 pulses). (J1: Paper Sensor ON Check)

Also, the copier CPU starts a timing cycle when the paper sensor is actuated. Then, at 2.75 (A4 sidewise) or 2.80 (Letter sidewise) seconds, the CPU checks whether the copy paper has passed through the paper sensor. (J2: Paper Sensor OFF Check)

In misfeed condition, the "Check Paper Path" and "Misfeed Location" indicators lights and copier operation is inhibited. To recover the sorter from the misfeed condition, the sorter has to be slide away from the copier, then, after misfed paper removal, returned to its original position.

9. INSTALLATION PROCEDURE

9.1 ACCESSORY CHECK

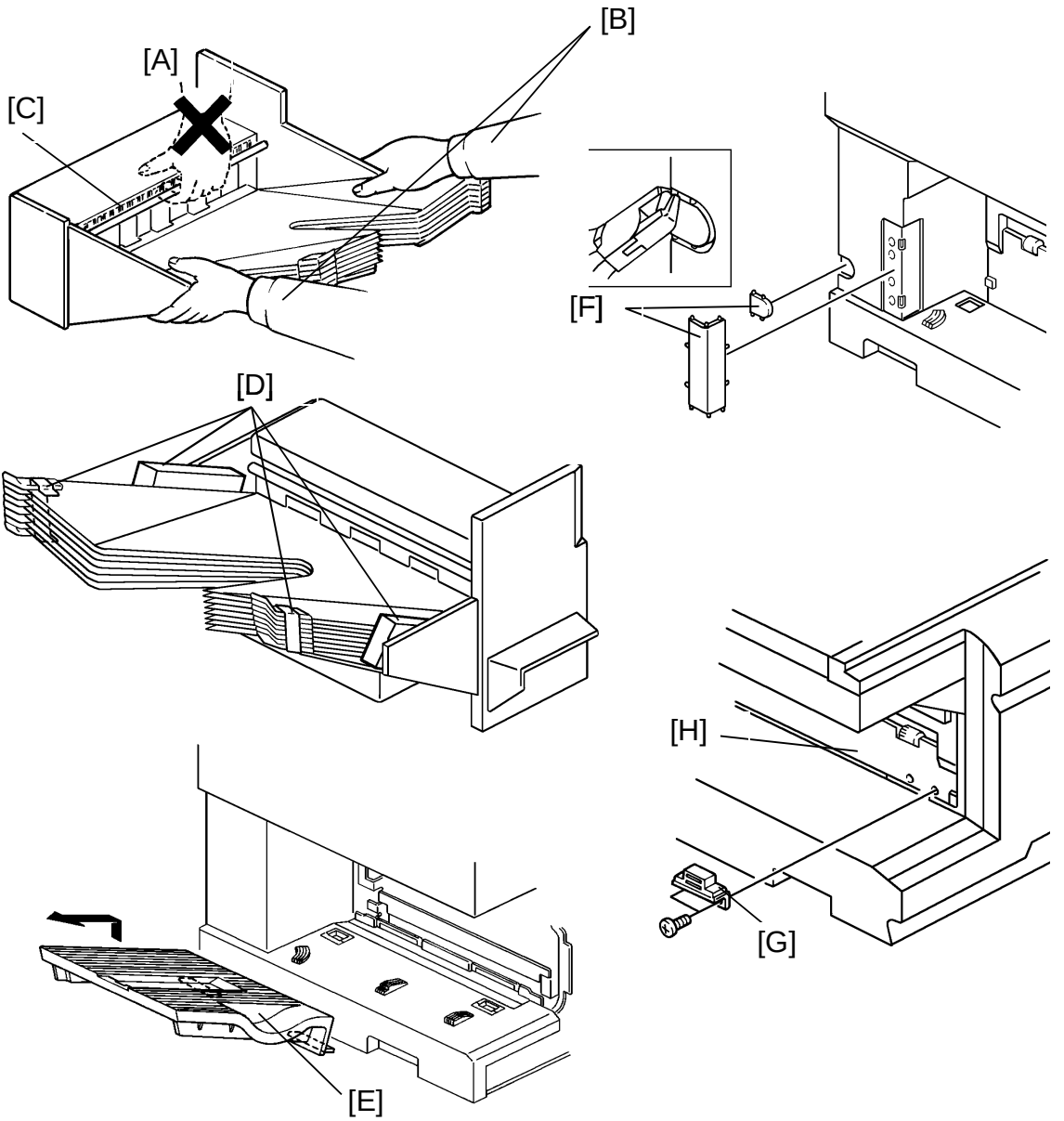
Check the quantity and condition of the accessories in the box according to the following list:

1. Magnet Catch 1
2. Sorter Holder Bracket 1
3. Sorter Holder Bracket Cover 1
4. Philips Pan Head Screw - M4 x 8 8
5. Philips Pan Head Screw - M4 x 8 1
6. Screw M4 x 8 1
7. Snap Ring 1

NOTE: 1. If the sorter is installed on the copier, the DC Power Supply Unit (option) is required.

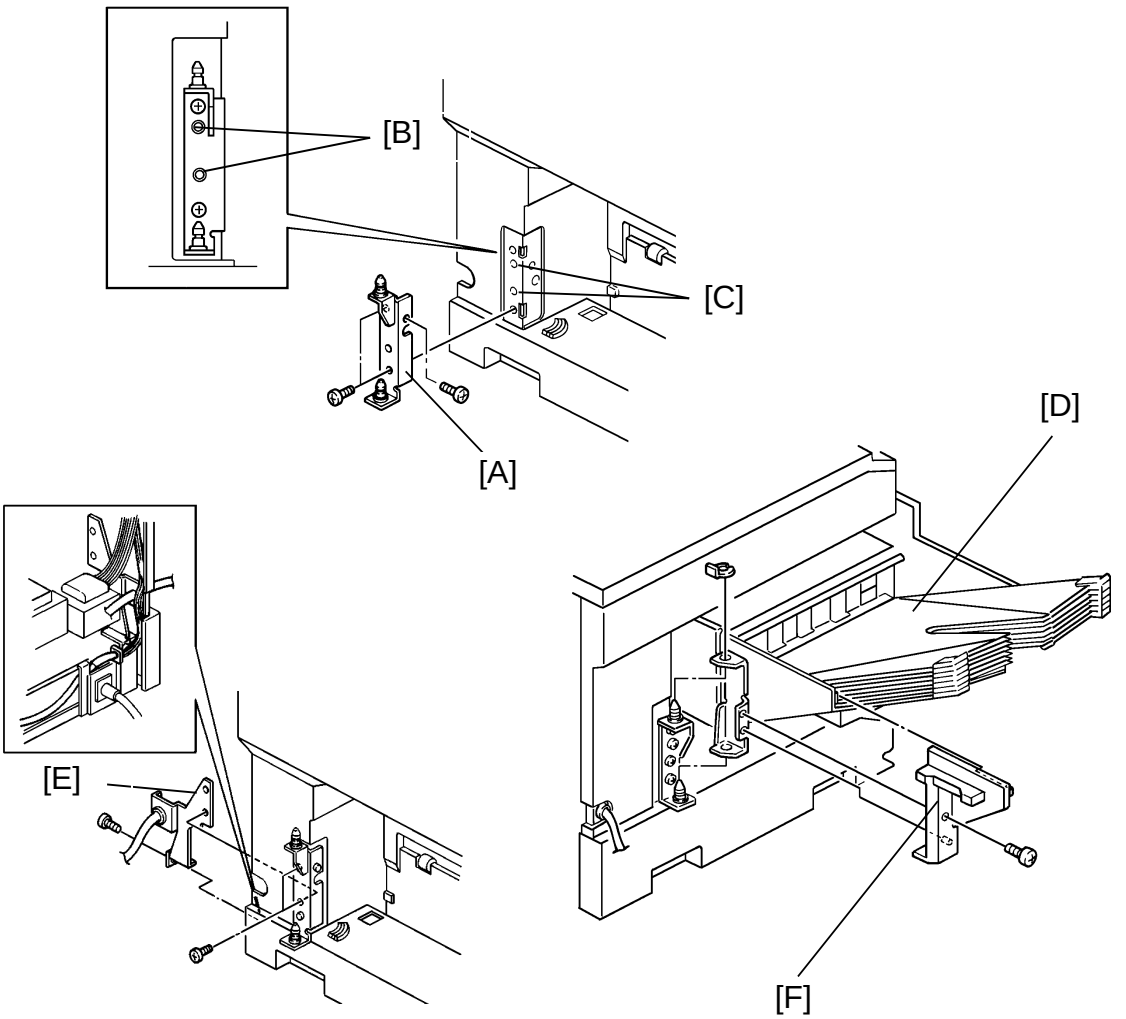
2. When installing the optional DC Power Supply Unit, please refer to the installation procedure enclosed with it.

9.2 INSTALLATION PROCEDURE

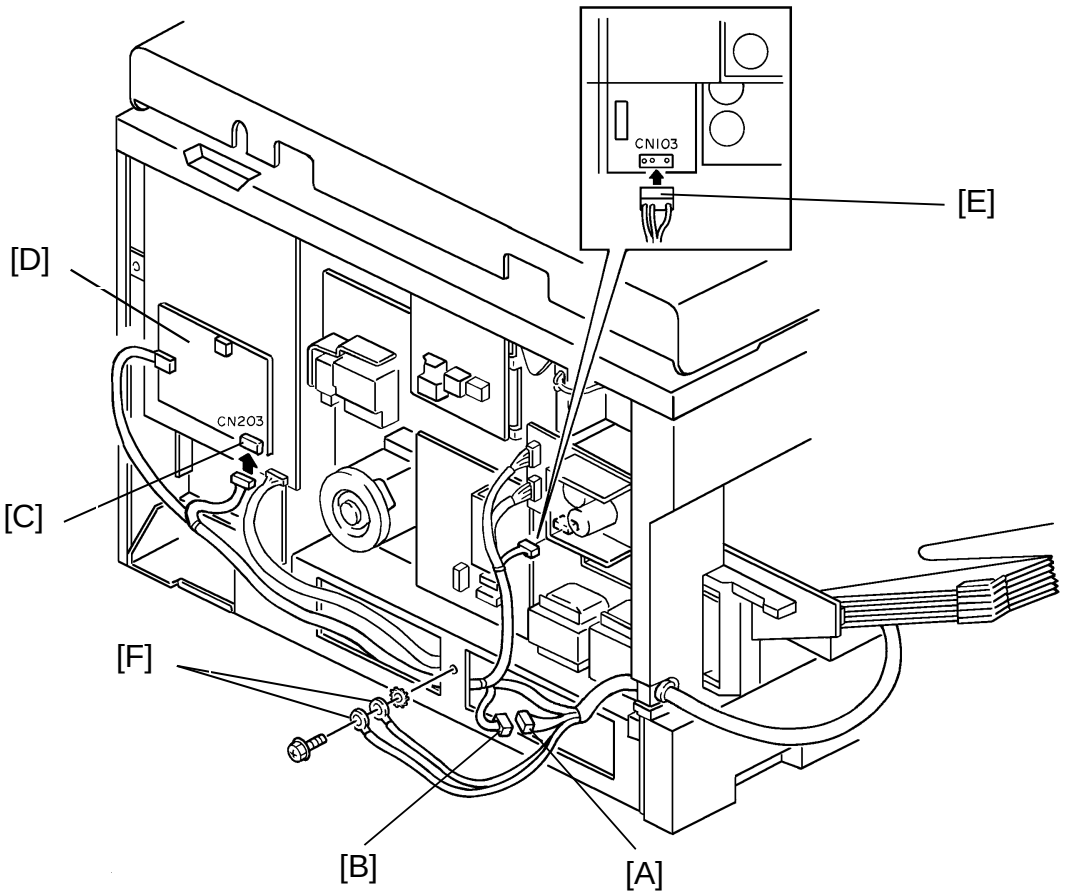


NOTE: Do not grasp the sorter by the top cover and stay as shown by [A]. Hold both sides of the sorter as shown by [B]. This is to prevent anti-static brush [C] damage.

1. Turn off the main switch and unplug the power supply cord of the copier.
2. Remove the strips and styrofoam blocks [D].
3. Remove the receiving tray [E].
4. Remove the caps [F] on the upper left side cover with the pliers.
5. Install the magnet catch [G] on the exit unit [H] (2 screws).

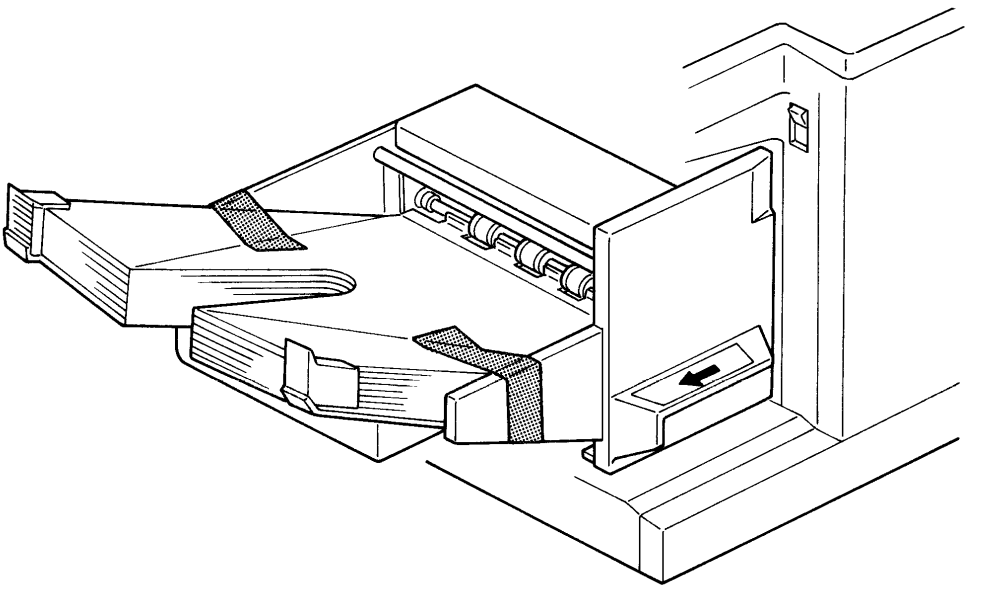


6. Install the sorter holder bracket [A] (3 screws) so that the two holes [B] on the bracket align with the holes [C] on the copier frame as shown.
7. Install the optional DC Power Supply Unit. (See the installation procedure enclosed with the unit.)
8. Install the sorter [D] on the sorter holder bracket (1 snap ring) as shown.
9. Install the sorter harness bracket [E] with the harness (1 screw).
10. Secure the sorter holder bracket and sorter harness bracket (2 screws).
11. Install the sorter holder bracket cover [F] (1 screw).



12. Connect the sorter dc harness [A] (10P/Brown) to the optional harness connector [B]; then, connect the optional harness connector [C] to CN203 on the interface board [D].
13. Connect the dc harness [E] (3P/White) to CN103 on the main dc power supply unit.
14. Secure the grounding wire [F] (1 screw and toothed washer) on the bottom plate as shown.
15. Plug in the copier power supply cord.
16. Turn on DIP switch 101-4 on the main board and turn on the main switch. Then, change the SP Mode #71 data to "1" (sorter instruction).
17. Turn off the main switch and DIP switch 101-4.
18. Replace all covers and turn on the main switch.
19. Check the operation of the sorter.

10. PREPARATION FOR TRANSPORTATION

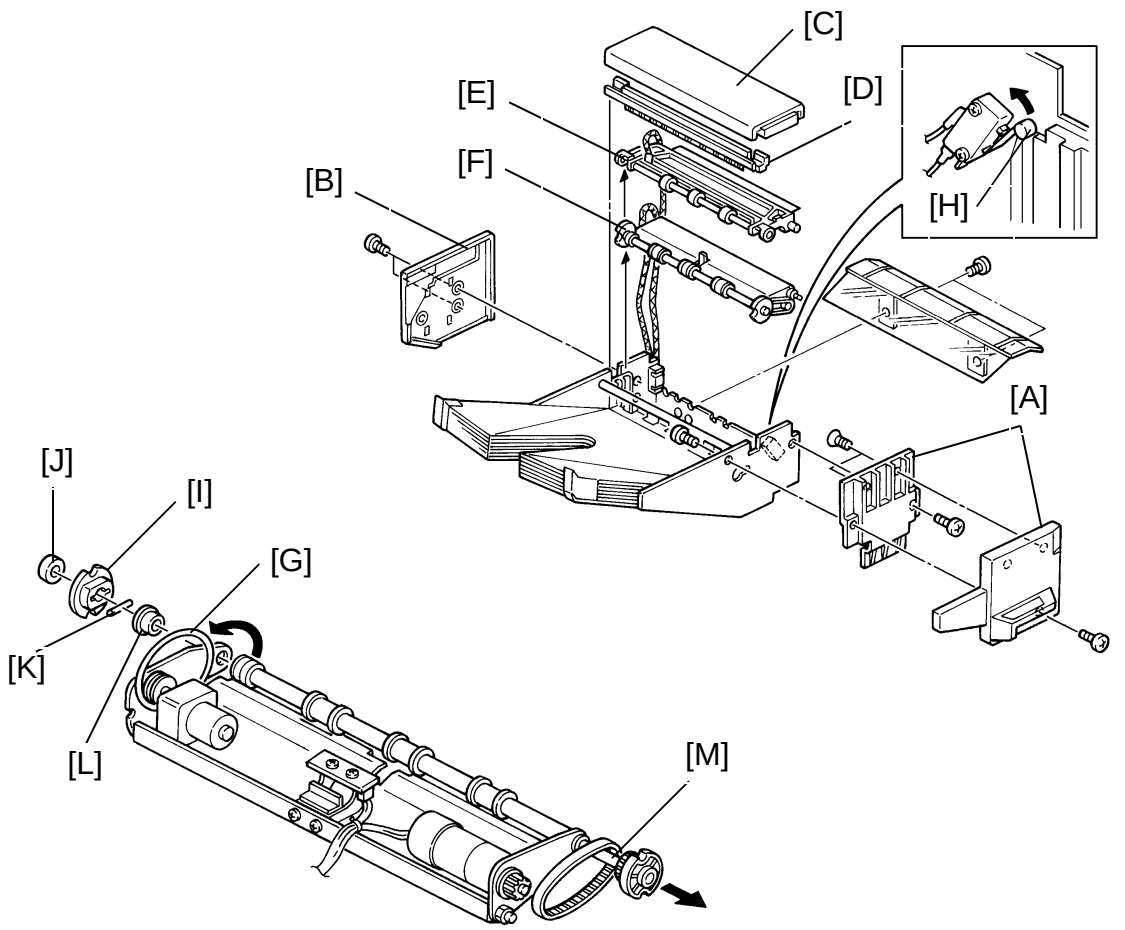


CAUTION: When removing and transporting the sorter, be careful not to carry it in a vertical position as the bins will become dislocated.

CAUTION: Before moving the sorter, be sure to prepare it for transportation as follows. The sorter may be badly damaged if it is moved without proper preparation.

1. If the bins are not at the home position, turn on the main switch of the copier to move the bins to the home position.
2. Secure the bins with strips of tape as shown in the illustration.
3. Remove the sorter from the copier. (See the Installation Procedure [Sorter] section.)

11. ROLLER DRIVE BELT REPLACEMENT



1. Remove the front covers [A] (5 screws) and rear cover [B] (2 screws).
2. Lift off the top cover [C] and remove the top stay [D].

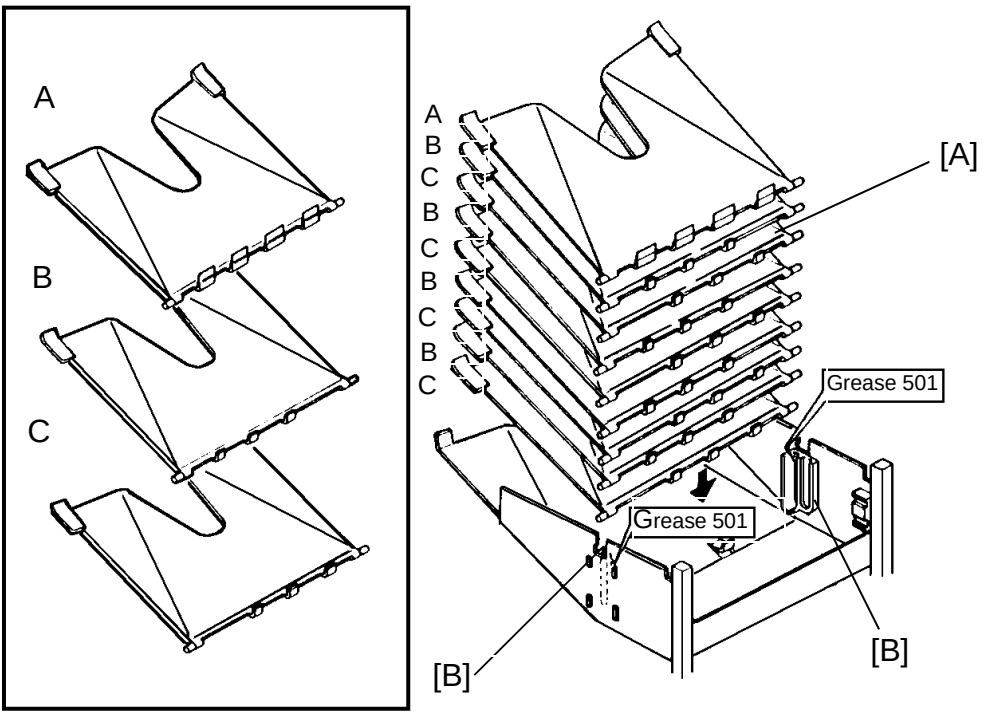
NOTE: Be sure that the discharge brush on the top stay is facing the exit side of the sorter when reinstalling it.

3. Lift the upper paper guide [E] up and out of position.
4. Lift the lower paper guide [F] out of position and turn it over to remove the roller drive belt [G].

NOTE: Be careful not to damage the sorter home position switch actuator [H] when reassembling.

5. Remove transfer wheel [I], spacer [J], pin [K] and bushing [L] (1 C-ring).
6. Slide the wheel shaft [M] towards the front and remove the roller drive belt.

12. BIN GUIDE LUBRICATION



1. Remove the lower paper guide. (See Roller Drive Belt Replacement section.)
2. Remove all bins [A] from the bin guides [B].
3. Apply Grease 501 to the grooves of the bin guides.

NOTE: There are three kinds of bins. Therefore, when installing the bins, be sure that they are installed in the correct order.

SECTION 10
DUPLEX

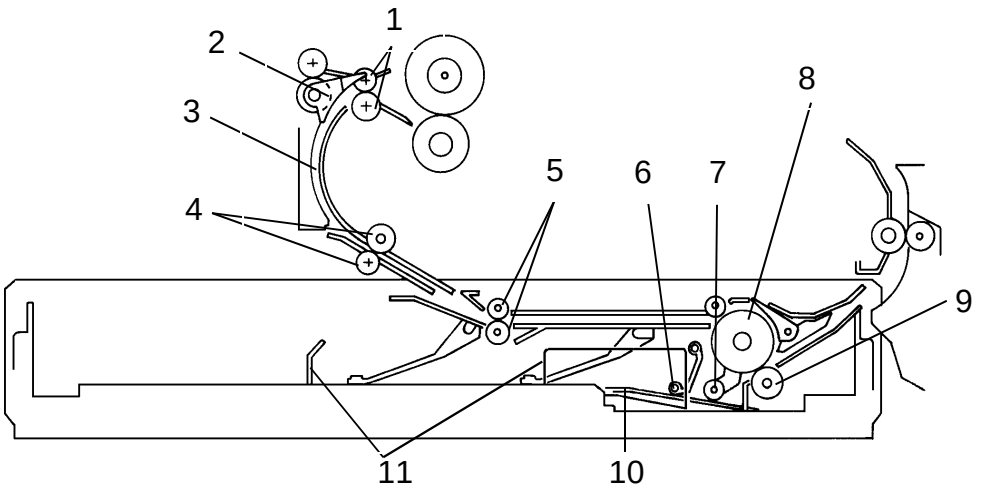
1. SPECIFICATIONS

Copy Paper Size:	A4 and B5/8 1/2" x 11" (sideways)
Paper Weight:	59 to 104 g/m2 (16 to 27 lb)
Paper Stack:	50 sheets
Dimension (W x D x H):	516 x 529 x 90 mm (20.4" x 20.9" x 3.6")
Weight:	Approximately 5 kg (11 lb)

- Specifications are subject to change without notice.

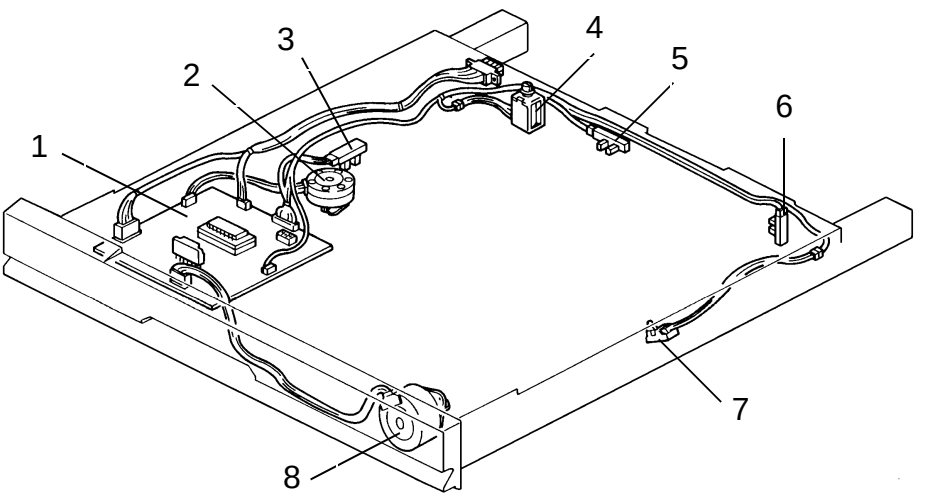
2. COMPONENT LAYOUT

— Mechanical Components —



1. Duplex Gate Roller
2. Duplex Gate
3. Turn Guide Plate
4. Transport Roller
5. Entrance Roller
6. Paper End Feeler
7. Paper Flattener
8. Duplex Feed Roller
9. Friction Roller
10. Duplex Bottom Plate
11. Jogger Fences

— Electrical Components —

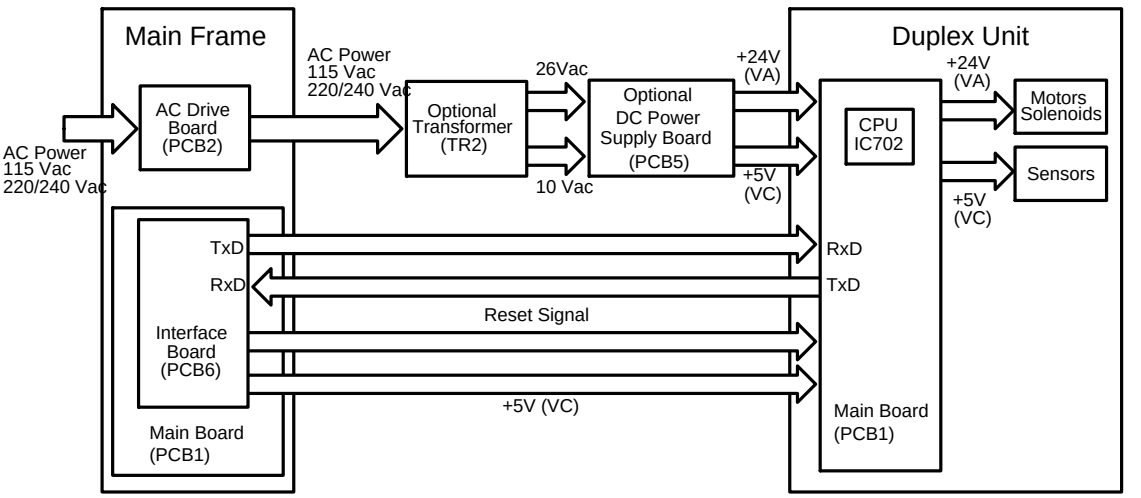


1. Main Board
2. Jogger Motor
3. Jogger HP Sensor
4. Duplex Gate Solenoid
5. Duplex Entrance Sensor
6. Duplex Paper End Sensor
7. Duplex Turn Sensor
8. Duplex Feed Motor

3. ELECTRICAL COMPONENT DESCRIPTION

SYMBOL	NAME	FUNCTION	INDEX NO.
Motors			
M1	Duplex Feed Motor	Stepper motor (24 Vdc) drives feed roller and moves the bottom plate up and down.	8
M2	Jogger Motor	Stepper motor (24 Vdc) drives the jogger fences to square the paper stack on the duplex tray.	2
Solenoids			
SOL 1	Duplex Gate Solenoid	Moves the duplex gate to direct copies to the duplex tray or to the paper exit.	4
Sensors			
S1	Duplex Entrance Sensor	Detects copy at the entrance.	5
S2	Duplex Turn Sensor	Detects copy in the turn section.	7
S3	Duplex Paper End Sensor	Detects copy in the duplex tray.	6
S4	Jogger Home Position Sensor	Detects whether the jogger fences are at home position.	3
Printed Circuit Board			
PCB1	Duplex Main Board	Controls all duplex unit functions.	1

4. POWER DISTRIBUTION AND OVERALL MACHINE CONTROL

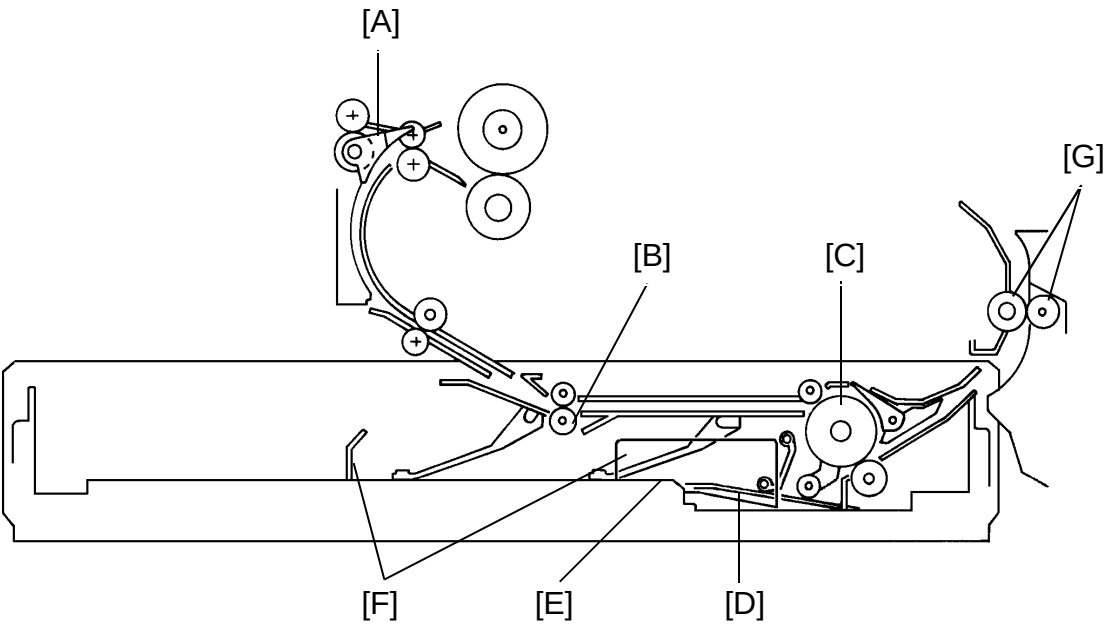


When the main switch is turned on, the optional transformer receives wall outlet ac power through the ac drive board and outputs 10 volts ac and 26 volts ac to the optional dc power supply board. The optional dc power supply board then converts the 10 volts ac input to +5 volts and the 26 volts ac input to +24 volts. Then, the +5 volts and +24 volts are supplied to the duplex unit main board. The interface board also provides +5 volts to the duplex unit main board and sends a reset signal to initialize the duplex unit CPU.

The duplex unit main board supplies dc power to all electrical components in the duplex unit. All motors and solenoid operate on +24 volts and all sensors operate on +5 volts.

The duplex unit has its own CPU which controls all functions in the duplex unit. The duplex unit CPU communicates with the copier through the interface board using a serial interface.

5. BASIC OPERATION



5.1 FIRST SIDE COPY

When the registration clutch turns on, the duplex gate [A] rotates up to direct the copy to the duplex unit. The entrance roller [B] and duplex feed roller [C] then start to rotate. At the same time, the duplex bottom plate [D] lowers.

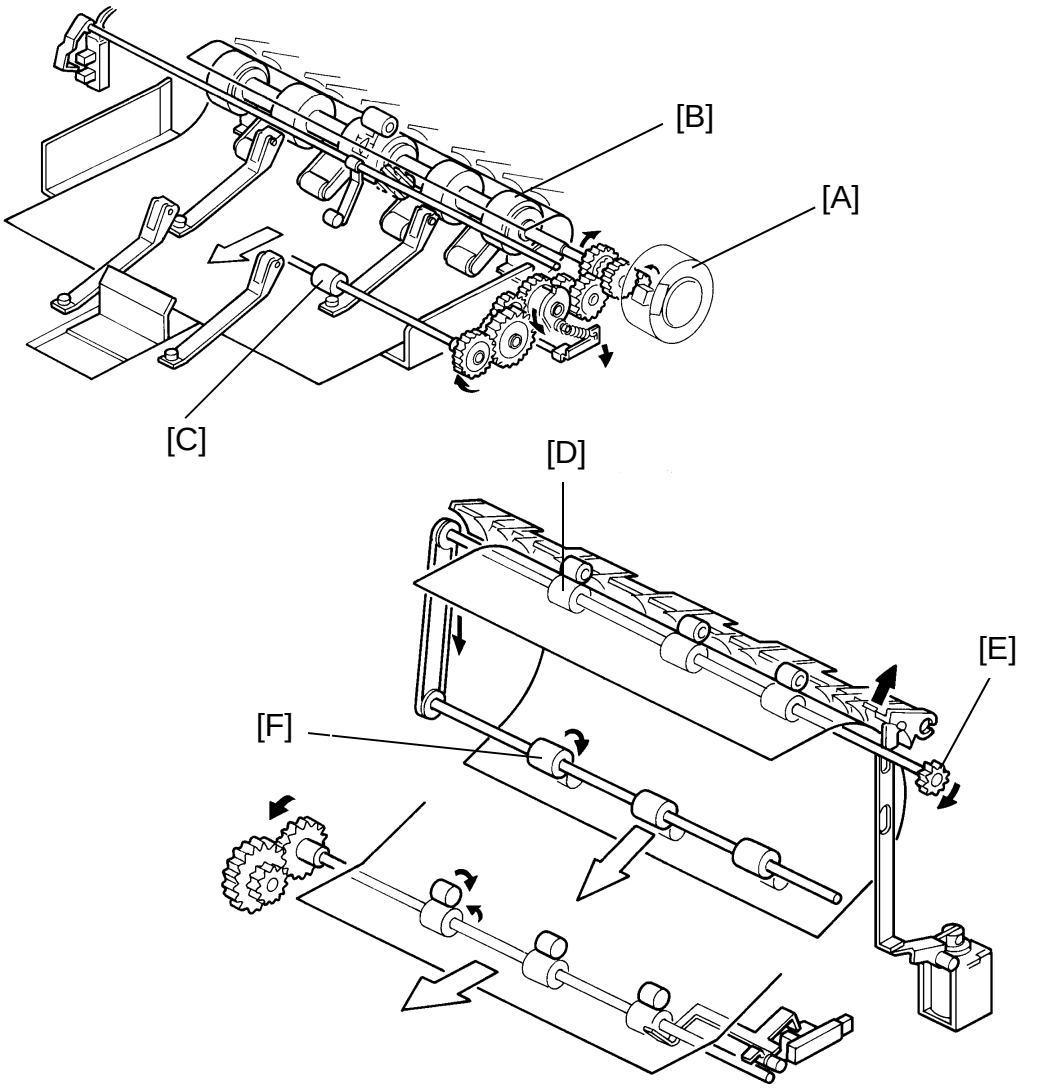
5.2 DUPLEX STACKING

After the copy is delivered to the duplex tray [E], the jogger fences [F] move inward to square the copy stack, then move back 10 mm. After the final copy is delivered to the tray, the jogger fences remain against the paper stack.

5.3 SECOND SIDE COPY

Soon after the final copy is squared by the jogger fences, the duplex bottom plate raises up to the final position and the duplex feed rollers start rotating counterclockwise (front view) to feed the copy to the relay rollers [G]. Second side copying is then done with the copy following the second feed station paper path.

6. DRIVE MECHANISM

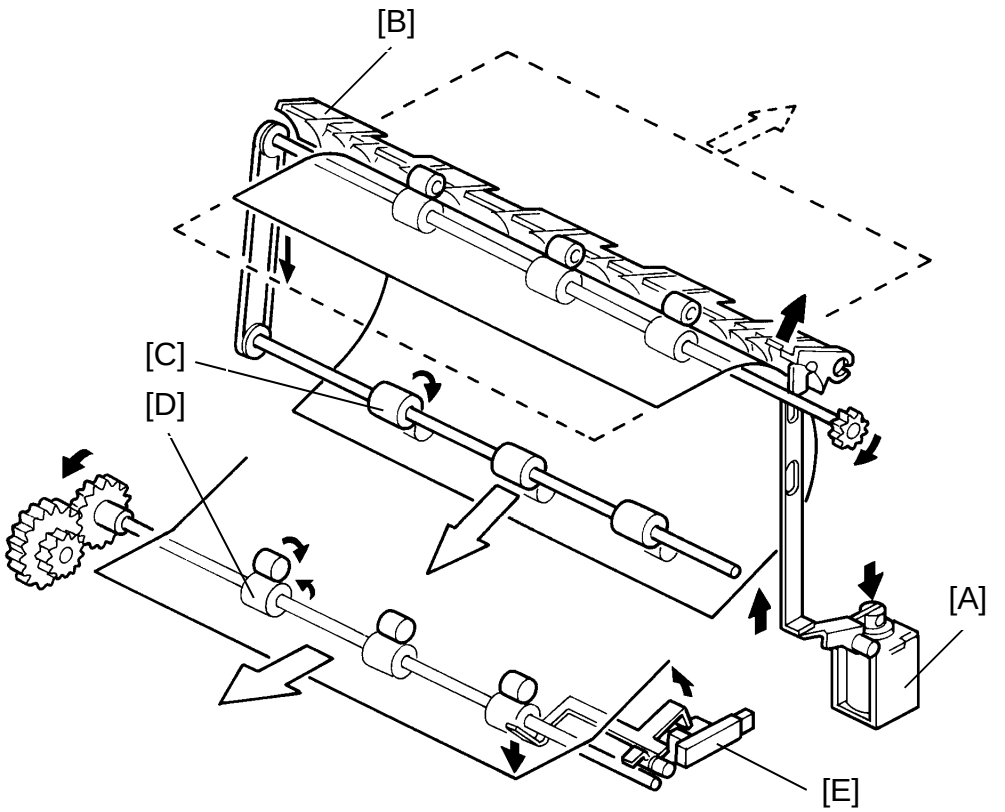


Drive is transmitted from the duplex feed motor [A] to the duplex feed rollers [B] and the entrance rollers [C] through a series of gears. A relay gear in the copier exit section transmits drive to the duplex gate rollers [D] through the duplex transport gear [E]. A rubber belt on the end of the duplex gate roller shaft drives the transport rollers [F].

The duplex feed motor also drives the duplex bottom plate up and down.

7. FIRST SIDE COPY

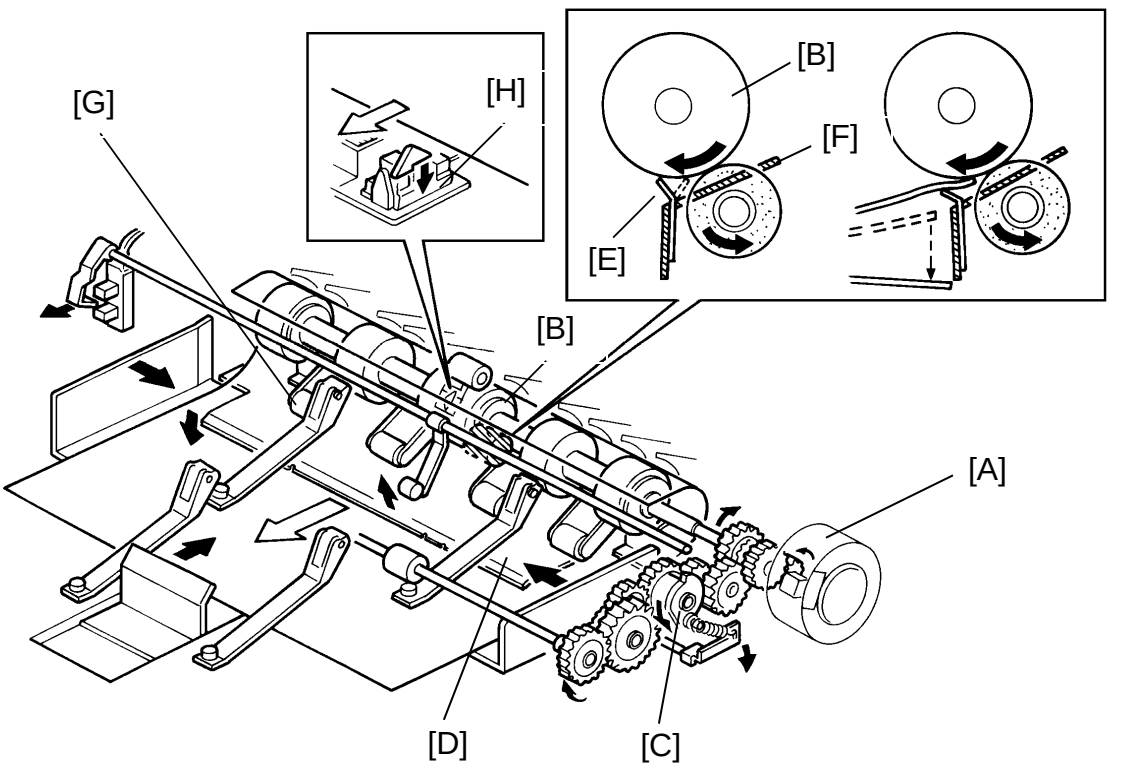
7.1 FROM COPIER PAPER FEED SECTION TO DUPLEX ENTRANCE ROLLER



When the copier 1st paper feed clutch turns on, the jogger motor turns on and drives the three jogger fences into position 10 mm from the edges of the copy paper. (This position is determined by cassette coding.) The registration clutch then turns on and the duplex gate solenoid [A] energizes to raise the duplex gate [B]. The duplex gate solenoid stays on until first side copying is finished.

The copy is then directed to the duplex turn guide, where it is fed by the transport rollers [C] to the entrance rollers [D]. The leading edge of the copy activates the duplex entrance sensor [E], which is monitored by the duplex CPU to detect misfeeds.

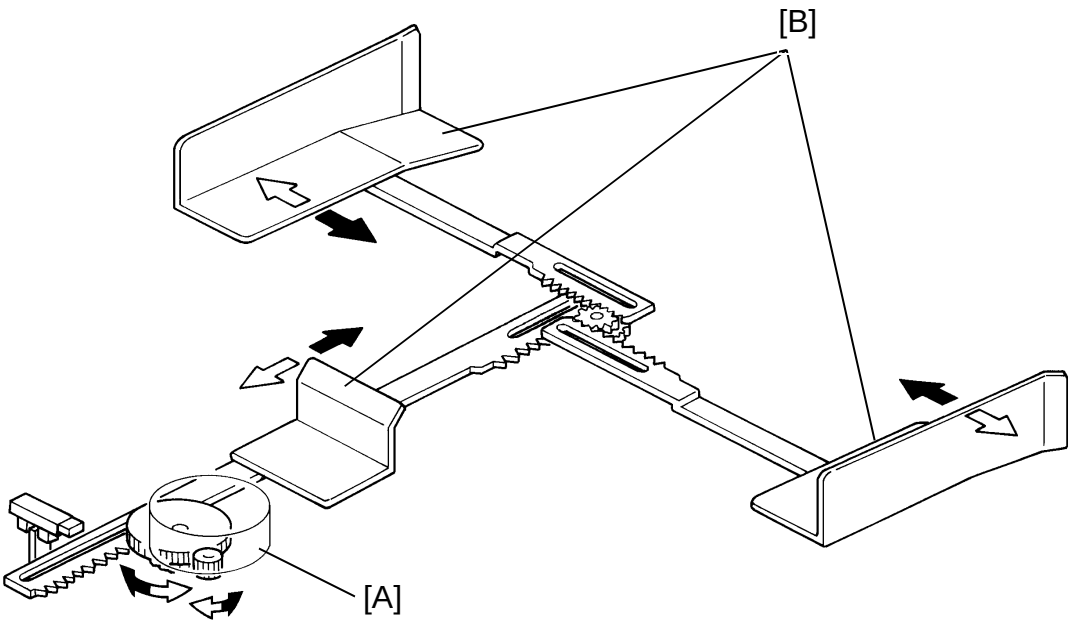
7.2 FROM DUPLEX ENTRANCE ROLLER TO DUPLEX TRAY



300 milliseconds after the duplex gate solenoid energizes, the duplex paper feed motor [A] starts turning counterclockwise (front view). Gears drive the duplex feed rollers [B] clockwise and the cam clutch [C] counterclockwise (front view). The cam clutch rotation lowers the duplex bottom plate [D].

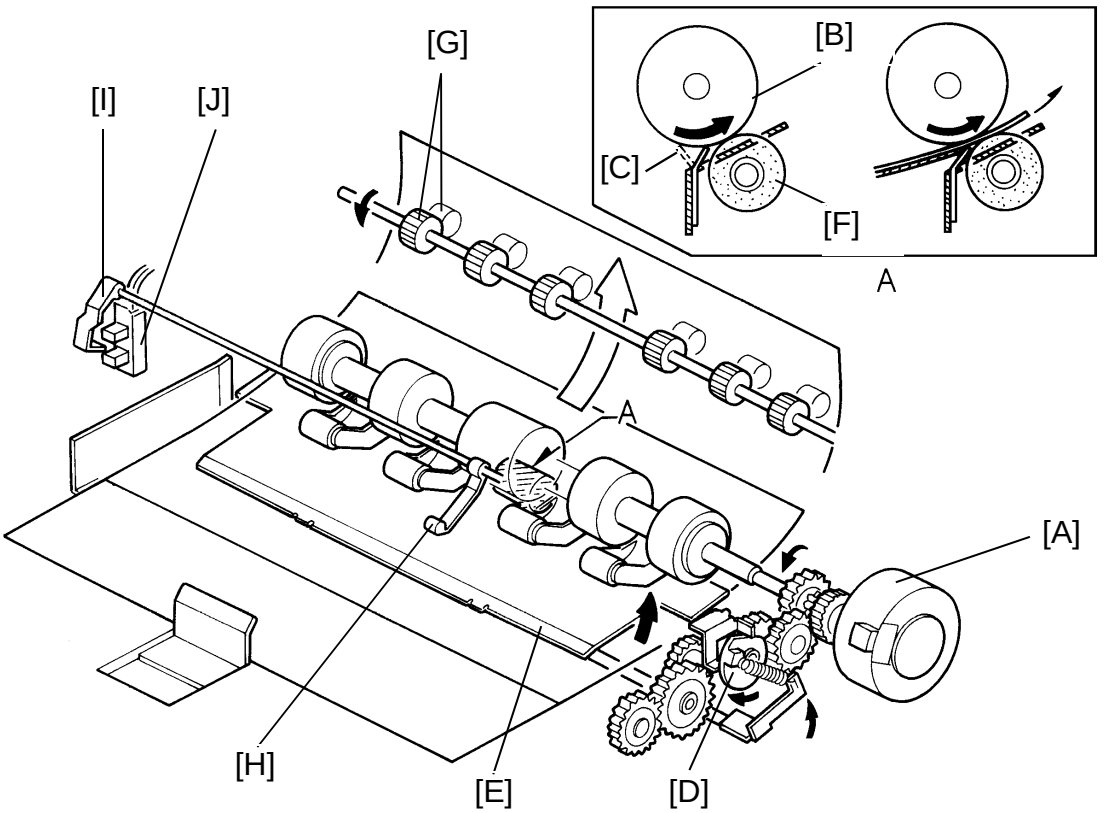
The tip of the flip mylar [E] moves to the left (front view) when the duplex feed rollers rotate to feed the copy into the duplex tray. The mylar presses the copy against the rollers, ensuring that the trailing edge of the copy clears the guide plate [F]. The paper flatteners [G] correct curl on the leading edge of the copies. The leading edge of the copy actuates the duplex turn sensor [H], which is monitored by the duplex CPU to detect misfeeds.

7.3 DUPLEX STACKING



2,150 milliseconds after the duplex turn sensor is actuated by the leading edge of the copy, the jogger motor [A] rotates to drive the jogger fences [B] inward to square the paper stack, then the fences move back 10 mm. After the last copy of the first side copying run enters the duplex tray, the fences remain against the stack.

8. SECOND SIDE COPY

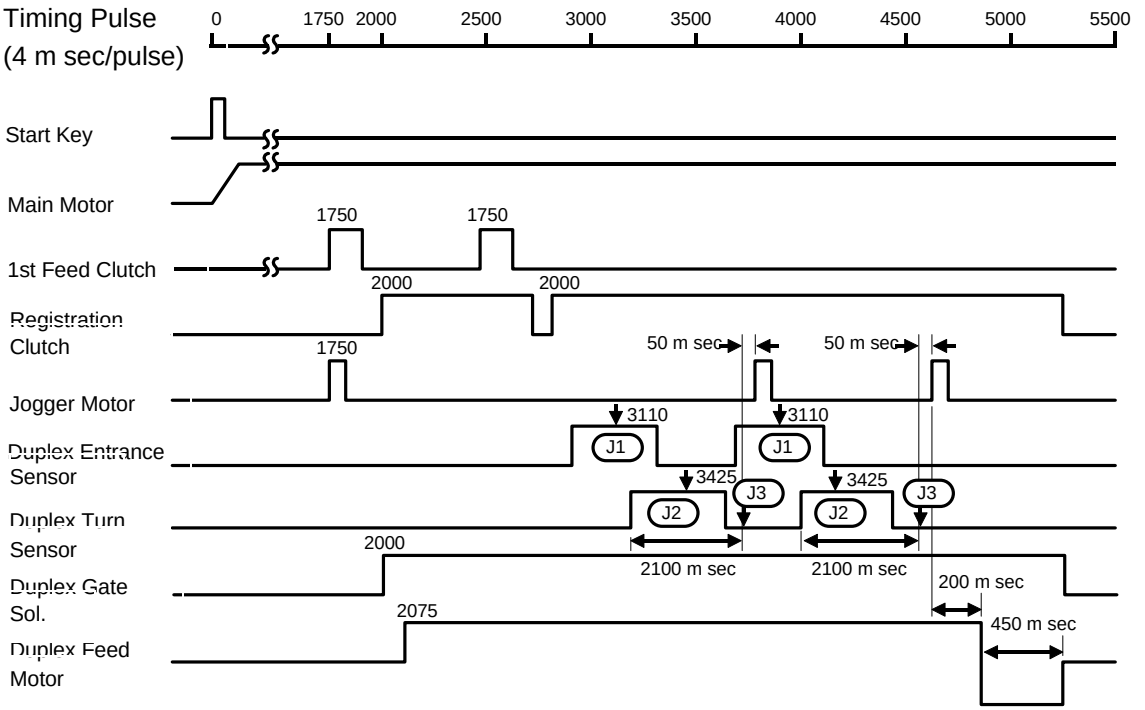


2,350 milliseconds after the duplex turn sensor is actuated by the leading edge of the final copy in the first side copy run, the duplex feed motor [A] reverses direction and rotates clockwise (front view), rotating the duplex feed roller [B] counterclockwise (front view). This moves the flip mylar [C] back to the right (front view). At the same time the cam clutch [D] rotates clockwise (front view), raising the duplex bottom plate [E].

The paper feed system, which consists of the duplex feed roller [B] and the friction roller [F], feeds only the top sheet of the stack copies to the relay rollers [G] in the copier. After that, the second side copies follow the second feed station paper path.

After the final copy leaves the duplex bottom plate, the paper end feeler [H] drops through a slot in the duplex bottom plate.The paper end actuator [I], which is on the same shaft as the paper end feeler, pivots into the duplex paper end sensor [J], sending a High signal to the main board to stop the next paper feeding cycle.

9. DUPLEX PAPER FEED AND MISFEED DETECTION TIMING



The duplex entrance sensor and the duplex turn sensor monitor the movement of the paper through the paper path in duplex mode. If the duplex CPU determines that a misfeed exists, the duplex CPU sends a misfeed signal to the copier CPU through the interface board, and the Check Paper Path and the Misfeed Location indicators turn on. When the main switch is turned on, the CPU checks these two sensors for initial misfeed. During the first side copy cycle, the duplex CPU performs three kinds of misfeed detection:

J1: Checks whether the duplex entrance sensor is actuated within 1,110 pulses (about 4.4 seconds) after the registration clutch turns on. (The Misfeed Location indicator "D" turns on.)

J2: Checks whether the duplex turn sensor is actuated within 1,315 pulses (about 5.3 seconds) after the registration clutch turns on. (The Misfeed Location indicator "E" turns on.)

J3: Checks whether the copy paper passes through the duplex entrance sensor 525 pulses (2.1 seconds) after the duplex turn sensor has been actuated. (The Misfeed Location indicator "E" turns on.)

In the second side copy cycle, the misfeed detection timing is same as the one in the second feed station copying.

10. SERVICE CALL CONDITIONS

Service Code 80: Duplex and Copier Main Board Communication Error

The copier main board does not receive any signal from the duplex main board.

Service Code 81: Interface Board Error

The interface board is not connected when the duplex unit is installed.

Service Code 82: Jogger Home Position Error

The output of the jogger home position sensor remains LOW as the duplex main board is driving the jogger fences outward.

Service Code 83: Jogger Home Position Error

The output of the jogger home position sensor remains HIGH as the duplex main board is driving the jogger fences inward.

11. DUPLEX UNIT INSTALLATION

11.1 ACCESSORY CHECK

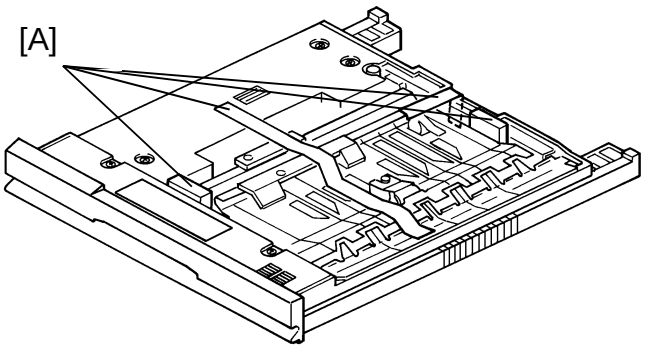
Check the quantity and condition of the accessories in the box according to the following list:

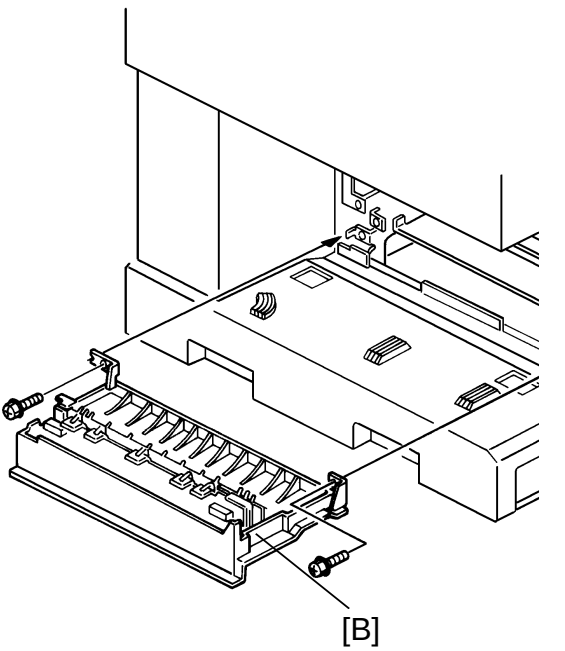
1. Turn Guide Plate 1
2. Roller 3
3. Connector Bracket 1
4. Shoulder Screw 2
5. Philips Pan Head Screw - M3 x 6 4
6. Tray Cover 1

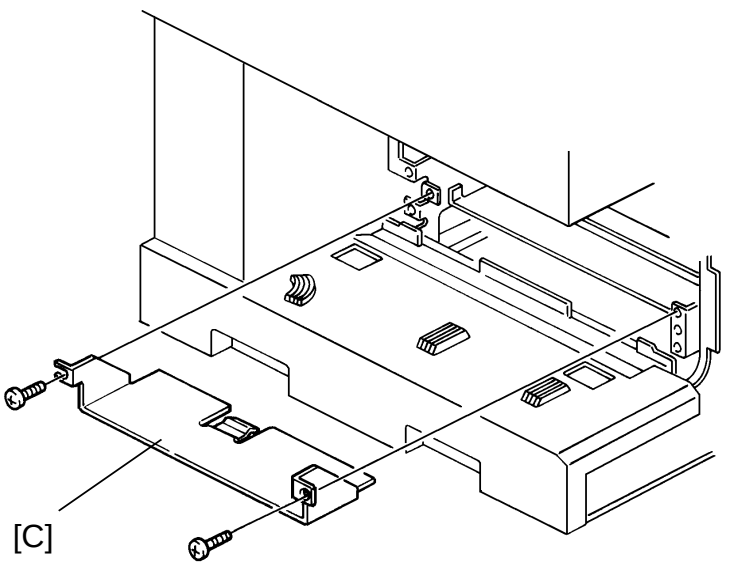
NOTE: 1. When the duplex unit is installed on the copier, the DC Power Supply Unit (option) is required.

2. When installing the DC Power Supply Unit, please refer to the installation procedure enclosed with it.

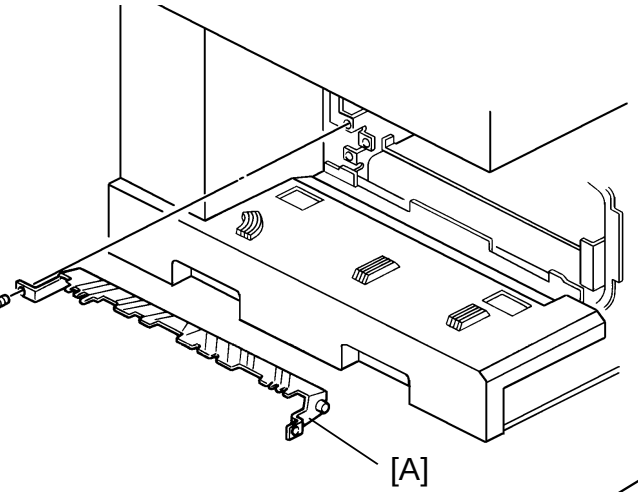
11.2 INSTALLATION PROCEDURE

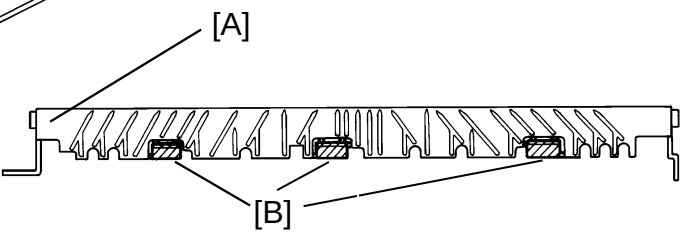


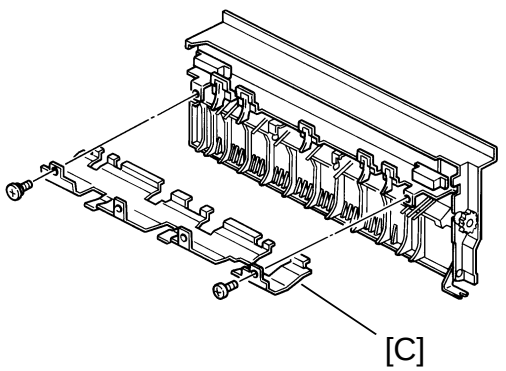


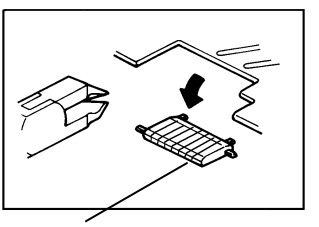


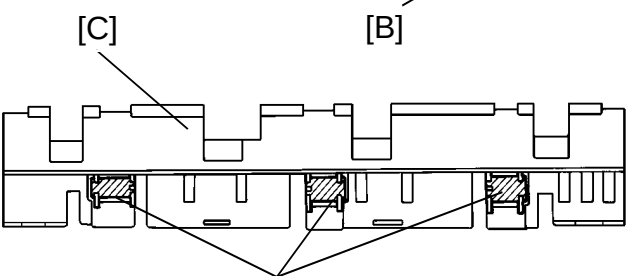
1. Turn off the main switch and unplug the copier power supply cord.
2. Install the dc power supply unit.
3. Remove the strips and styrofoam blocks [A].
4. Open the exit unit [B] and remove it (2 screws).
5. Remove the fusing bottom plate [C].

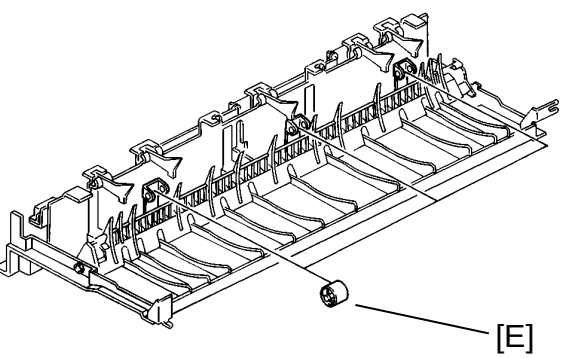


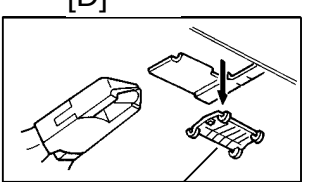




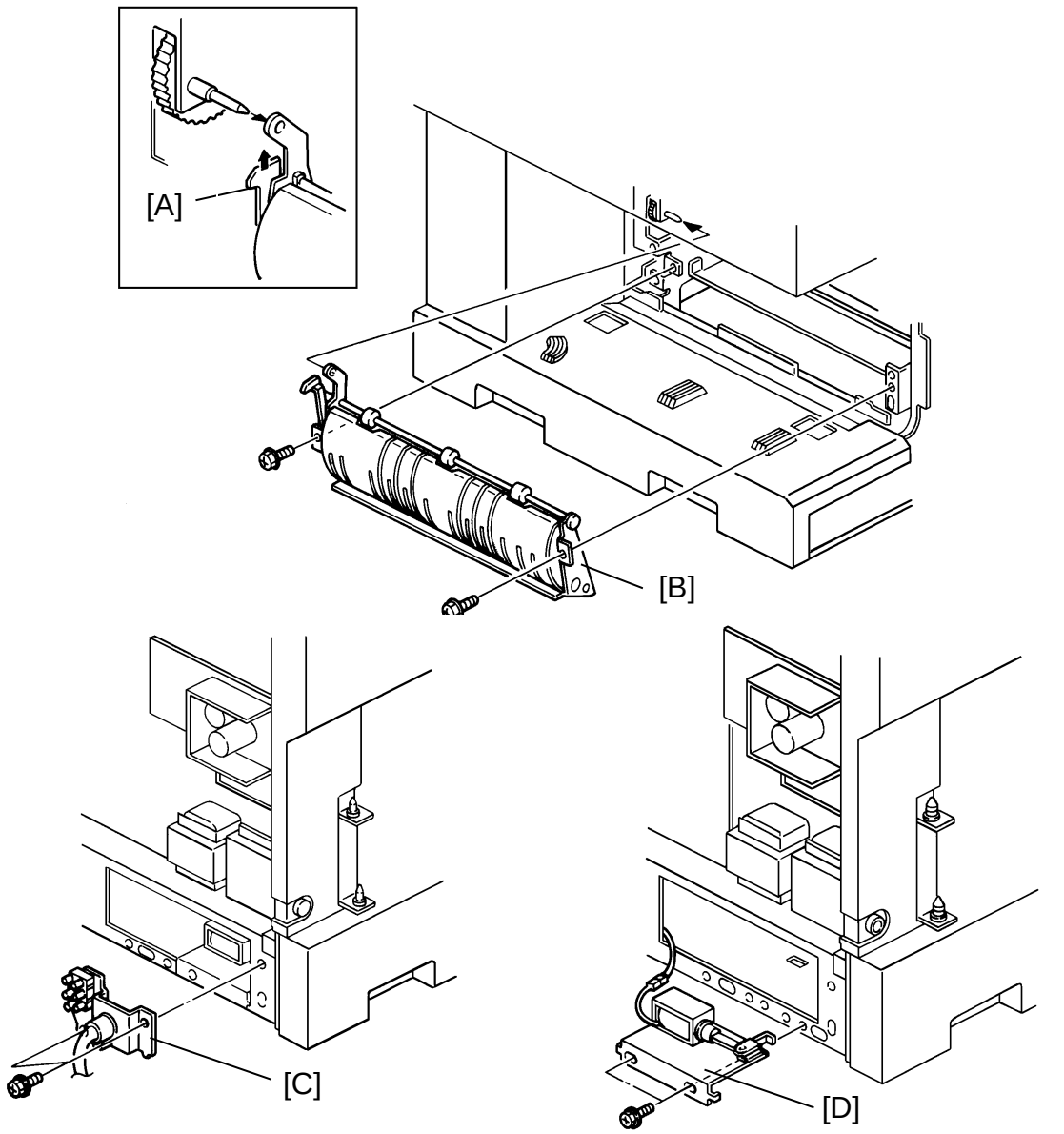




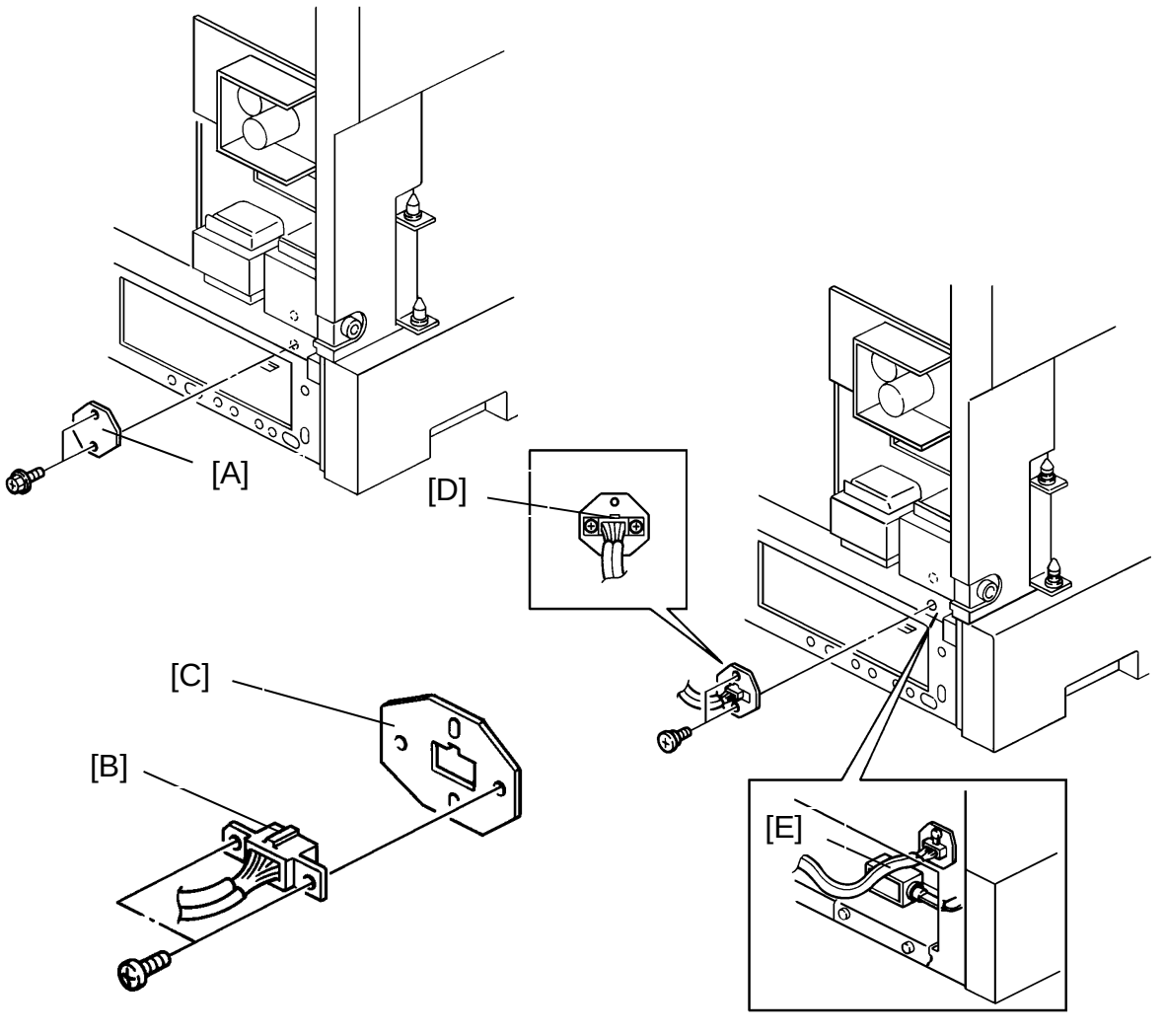




6. Remove the exit paper guide [A] (1 screw), and remove the stubs [B] with nippers and reinstall the exit paper guide.
7. Remove the upper paper guide [C] on the exit unit (2 screws) and remove the stubs [D] with nippers.
8. Install the three rollers [E] on the exit unit as shown.
9. Reinstall the upper paper guide plate [C] on the exit unit.



10. While pushing up the duplex gate lever [A], install the turn guide plate [B] (2 screws).
11. Reinstall the exit unit (2 screws).
12. Remove the paper tray from the copier if it is installed.
13. Remove the power supply cord bracket [C] (2 screws).
14. Remove the tray lock solenoid bracket [D] (1 screw).

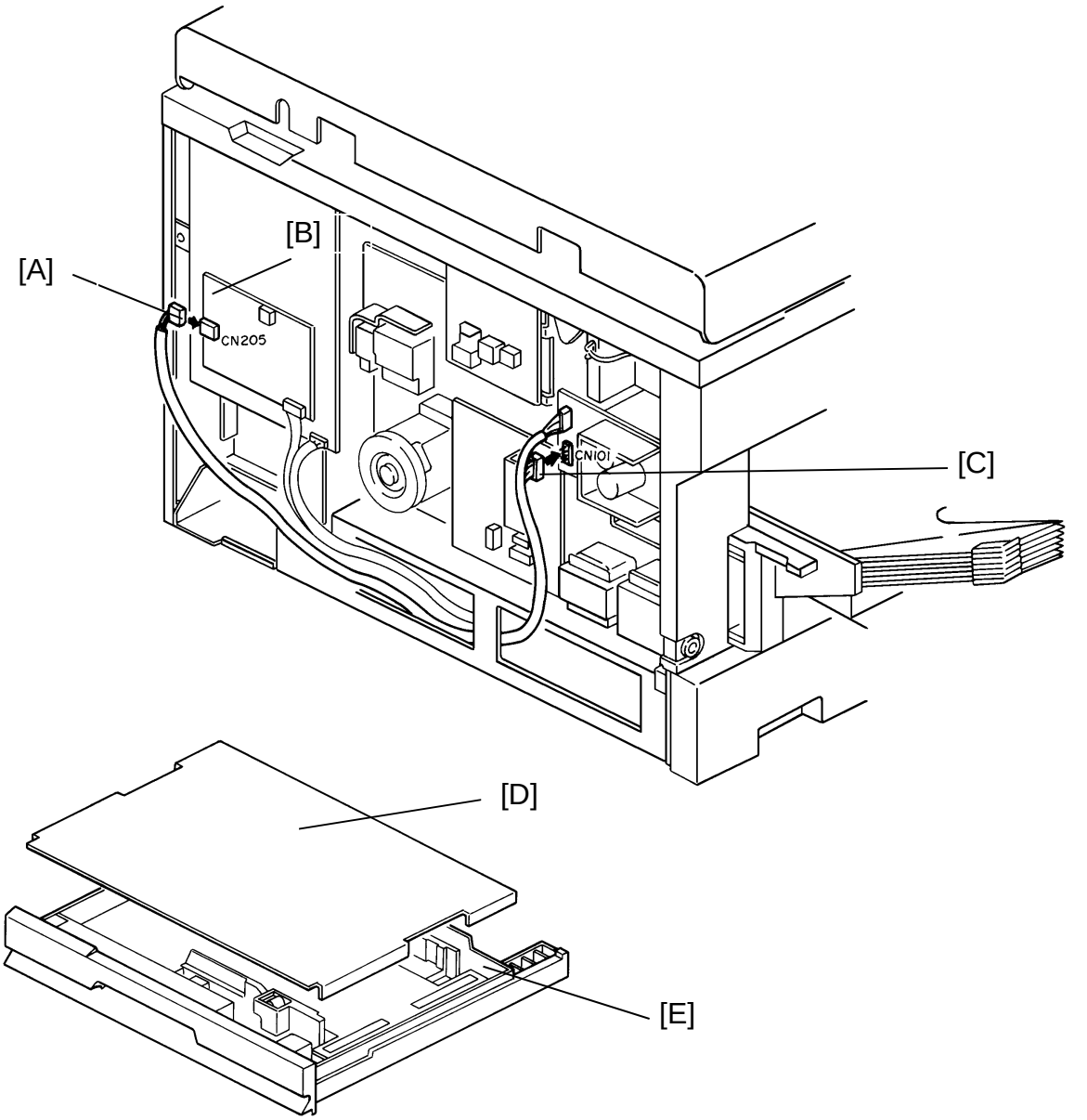


15. Remove the duplex connector cover plate [A] (2 screws).

    NOTE: The cover plate can be thrown away.
16. Secure the optional harness duplex connector (8P/Black) [B] to the connector bracket [C] (2 screws).

    NOTE: When installing the bracket, make sure that the cut-out [D] on the bracket faces up as shown.
17. Secure the connector bracket to the rear frame (2 shoulder screws).

    NOTE: Make sure that the duplex harness [E] does not interfere with lock solenoid movement.
18. Reinstall all the brackets.

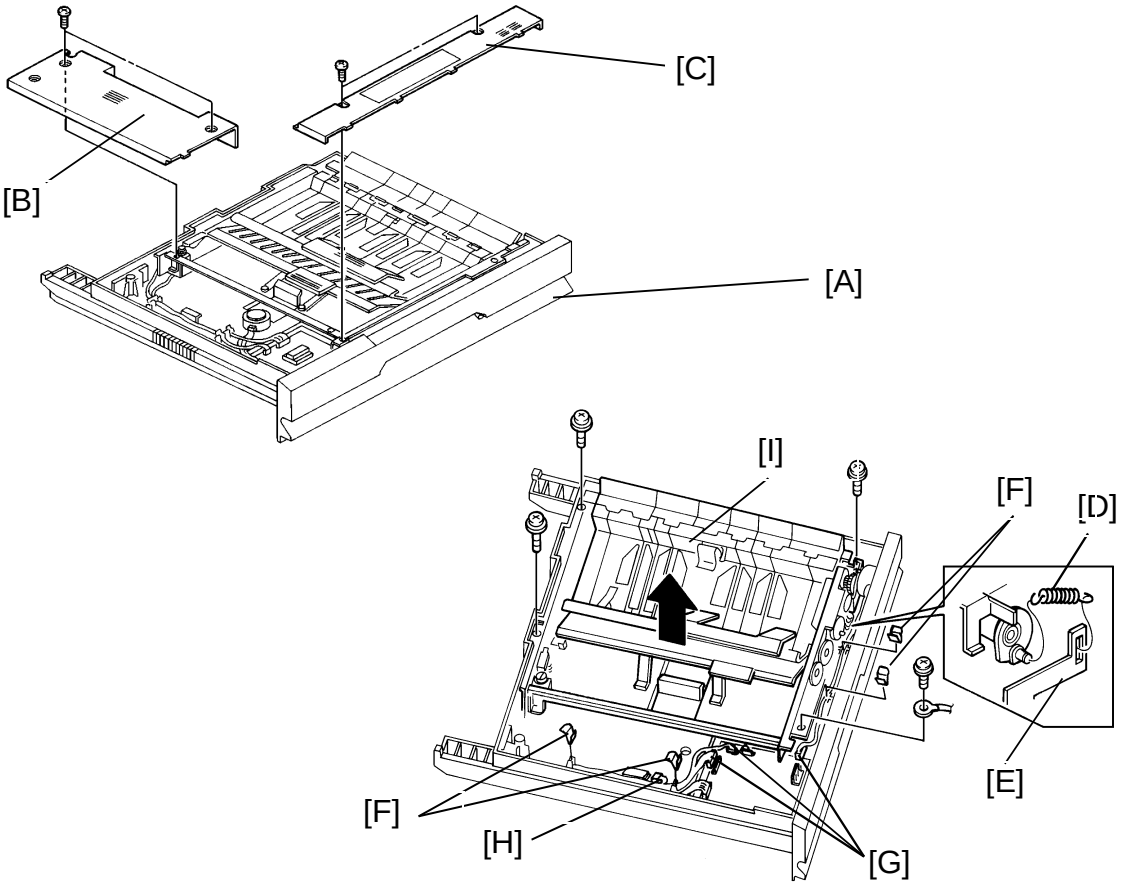


19. Connect the optional harness connector (4P/Black) [A] to CN205 on the interface board [B].
20. Connect the dc harness (4P/White) [C] to CN101 on the optional dc power supply unit.
21. Reinstall the rear cover (2 screws).
22. Insert the duplex unit into the copier.
23. Plug in the copier power supply cord and turn on the main switch.
24. Check the operation of the duplex unit.
25. Attach the tray cover [D] on the paper tray [E] as shown.

NOTE: Explain to the customer how to install the tray cover.

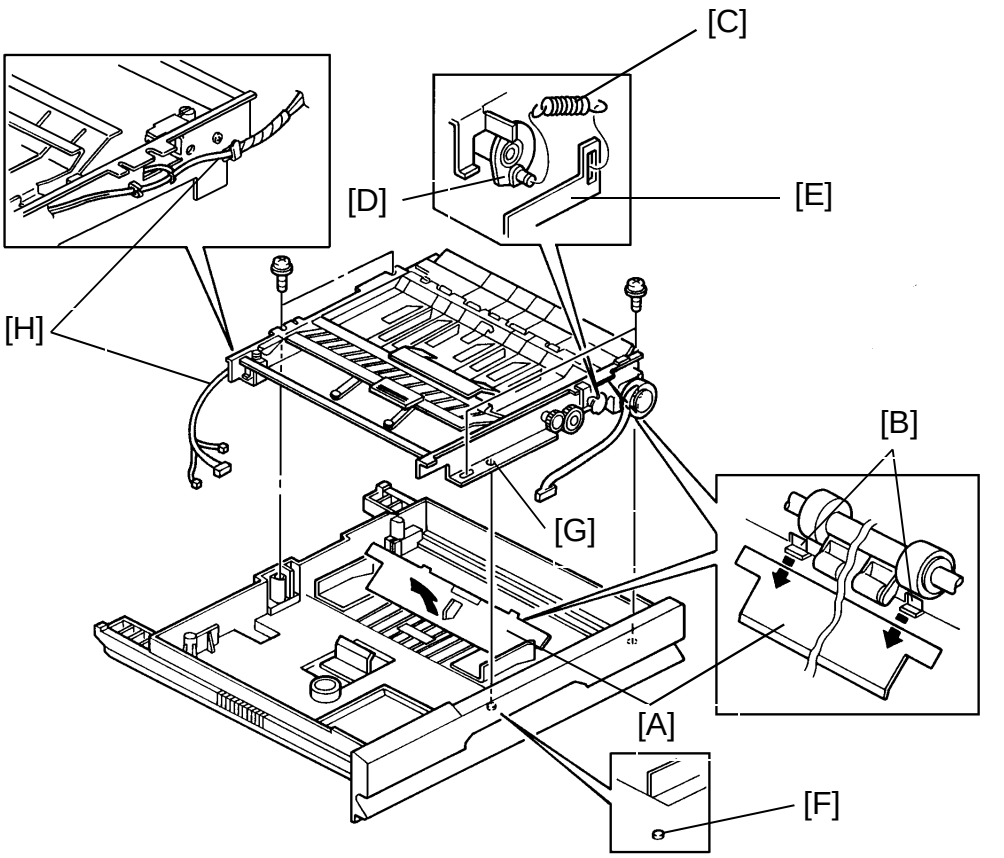
12. REPLACEMENT AND ADJUSTMENT

12.1 DUPLEX TRAY REMOVAL



1. Pull the duplex tray [A] out from the copier.
2. Remove the side inner cover [B] (3 screws).
3. Remove the front inner cover [C] (2 screws).
4. Unhook the pressure spring [D] from the paper lift arm [E] and the eccentric cam.
5. Remove the clamps [F] with a pair of plyers.
6. Disconnect CN702, CN704, and CN706 [G] from the main board.
7. Disconnect the sensor connector [H] from the jogger h. p. sensor.
8. Remove the duplex unit [I] (4 screws and grounding wire) from the tray.

NOTE: Hold both sides of the duplex unit frame when lifting the duplex unit out of the tray.



- Installation -

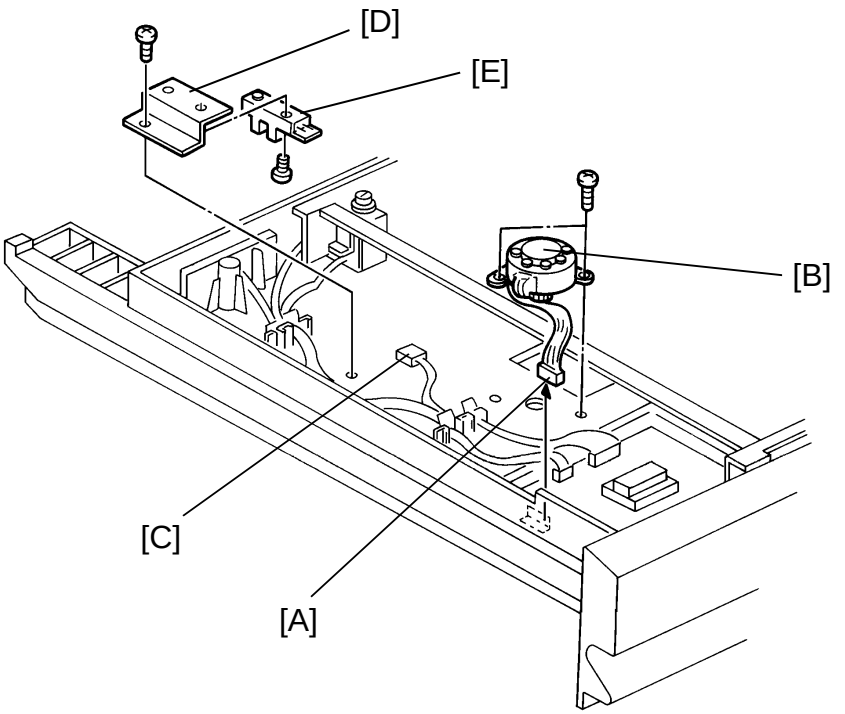
1. When placing the duplex unit back into the tray, hold up the bottom plate [A] so that the mylar brackets [B] fit under it as shown.
2. Hook the pressure spring [C] to the eccentric cam [D] and the paper lift arm [E] as shown.

NOTE: When installing the duplex unit, make sure of the following:

a) Positioning pin [F] fits through hole [G] in the side plate.

b) The sensor harness [H] is clamped correctly and is not caught under the unit frame.

12.2 JOGGER MOTOR AND JOGGER HOME POSITION SENSOR REPLACEMENT



1. Remove the duplex tray.
2. Remove the front and side inner covers.

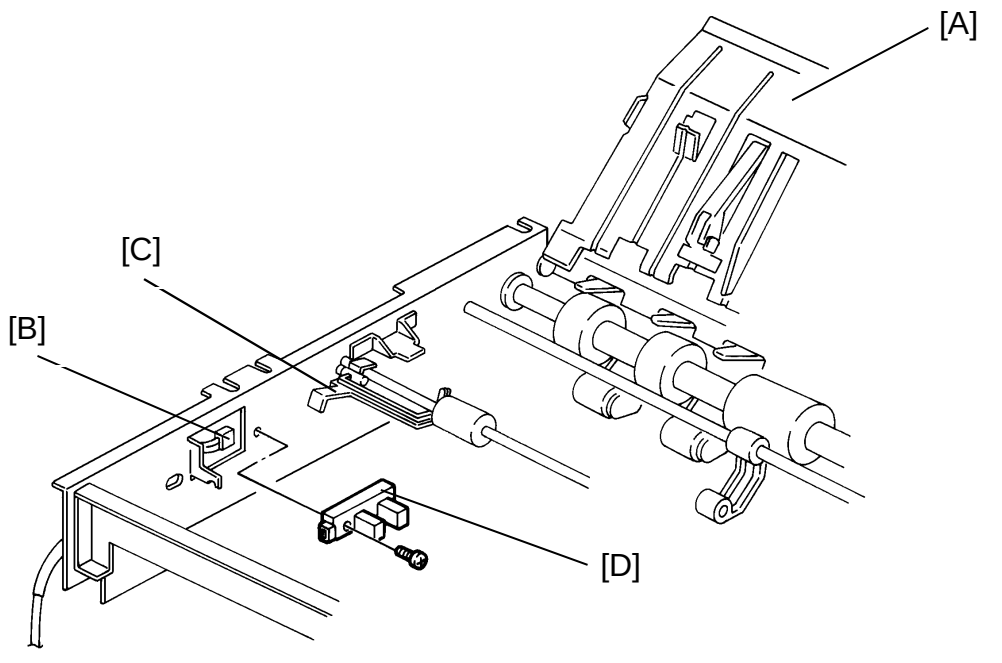
- Jogger Motor Replacement -

3. Disconnect CN705 [A] from the duplex main board.
4. Replace the jogger motor [B] (2 screws).

- Jogger Home Position Sensor Replacement -

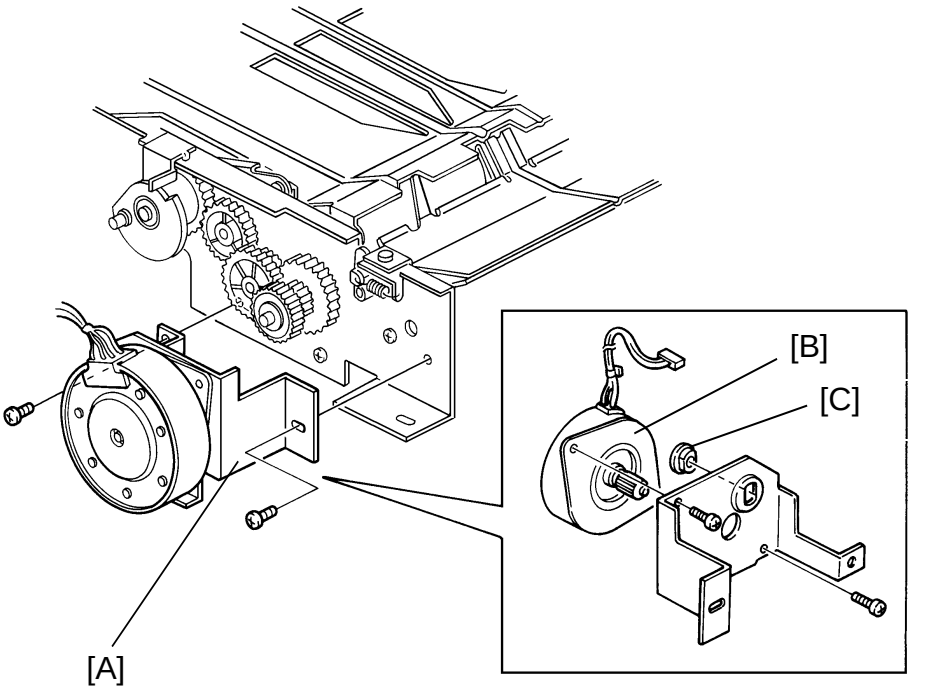
3. Disconnect the sensor connector [C].
4. Remove the sensor bracket [D] (1 screw).
5. Remove the sensor [E] from the bracket and replace it (1 screw).

12.3 TURN SENSOR REPLACEMENT



1. Remove the duplex tray.
2. Raise the upper and lower paper guides [A] all the way up.
3. Disconnect the turn sensor connector [B].
4. While lifting the sensor actuator [C], remove the sensor [D] (1 screw).

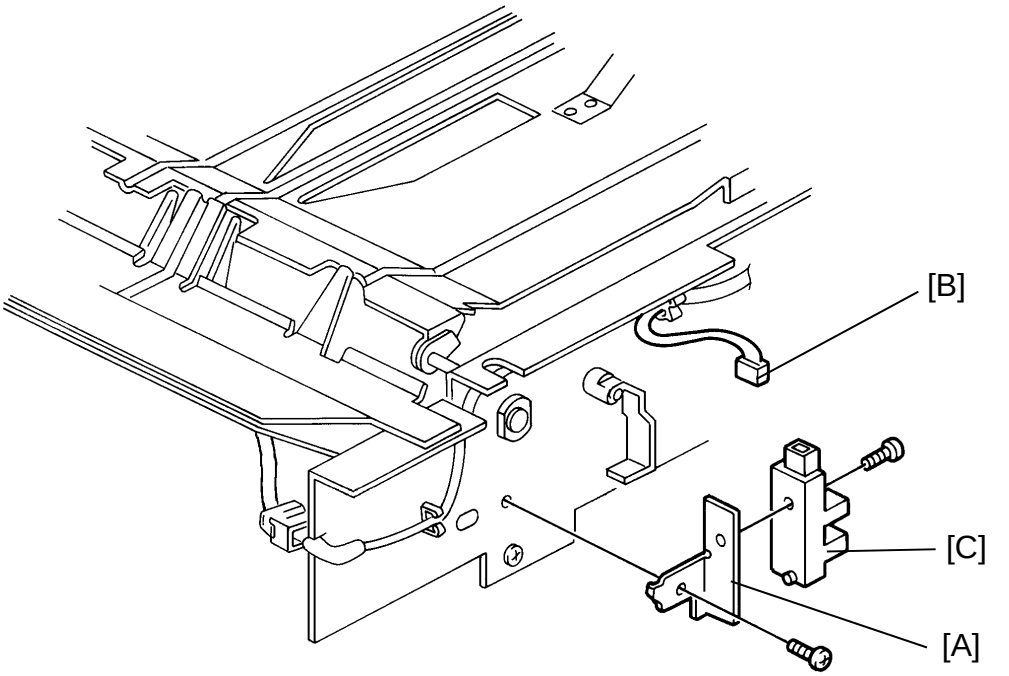
12.4 FEED MOTOR REPLACEMENT



1. Remove the duplex unit from the tray. (See Duplex Unit Removal.)
2. Remove the paper feed motor bracket [A] (2 screws).
3. Replace the feed motor [B] (2 screws).

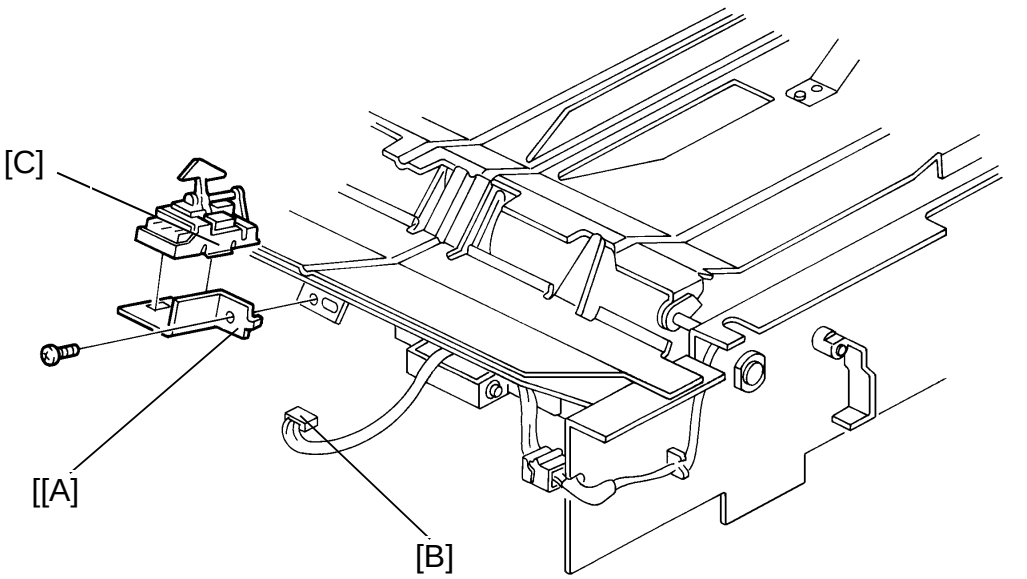
NOTE: When installing the paper feed motor, make sure that the bushing [C] is properly positioned between the bracket and the motor as shown.

12.5 PAPER END SENSOR REPLACEMENT



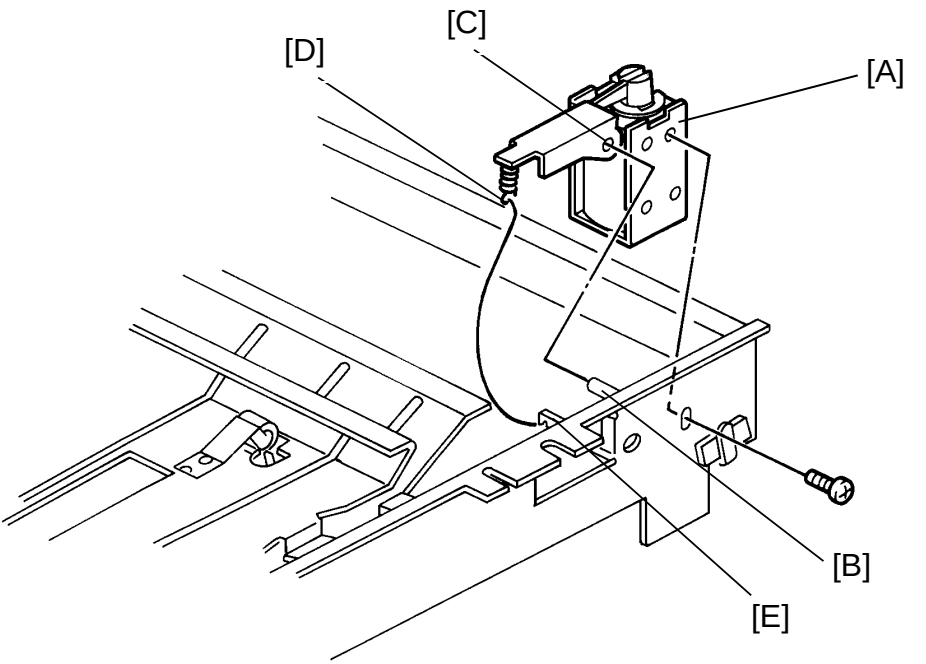
1. Remove the duplex unit from the tray. (See Duplex Unit Removal.)
2. Remove the paper end sensor bracket [A] (1 screw).
3. Disconnect the sensor connector [B].
4. Replace the sensor [C] (1 screw).

12.6 ENTRANCE SENSOR REPLACEMENT



1. Remove the duplex unit from the tray. (See Duplex Unit Removal.)
2. Turn over the duplex unit as shown.
3. Remove the entrance sensor bracket [A] (1 screw).
4. Disconnect the sensor connector [B].
5. Replace the sensor [C].

12.7 GATE SOLENOID REPLACEMENT



1.Remove the duplex unit from the tray. (See Duplex Unit Removal.)

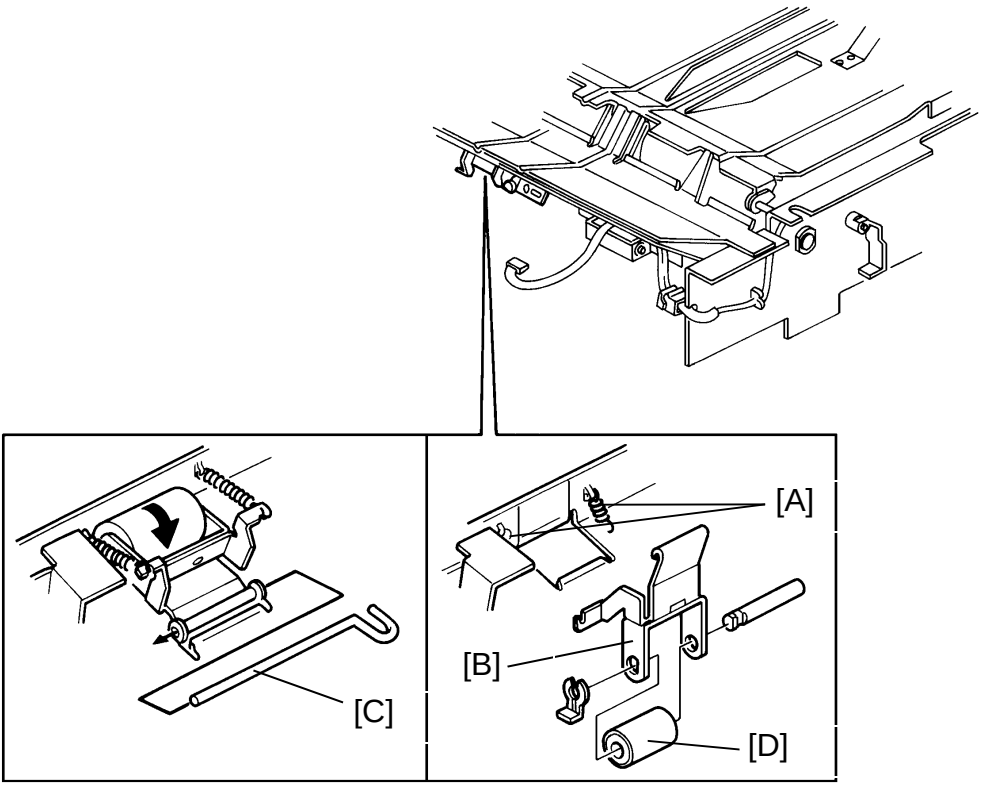
2. Replace the gate solenoid [A] (1 screw).

NOTE: When installing a new solenoid, make sure of the following:

a) Positioning pin [B] fits into the hole [C] on the gate solenoid actuator.

b) Spring [D] is hooked to bracket [E].

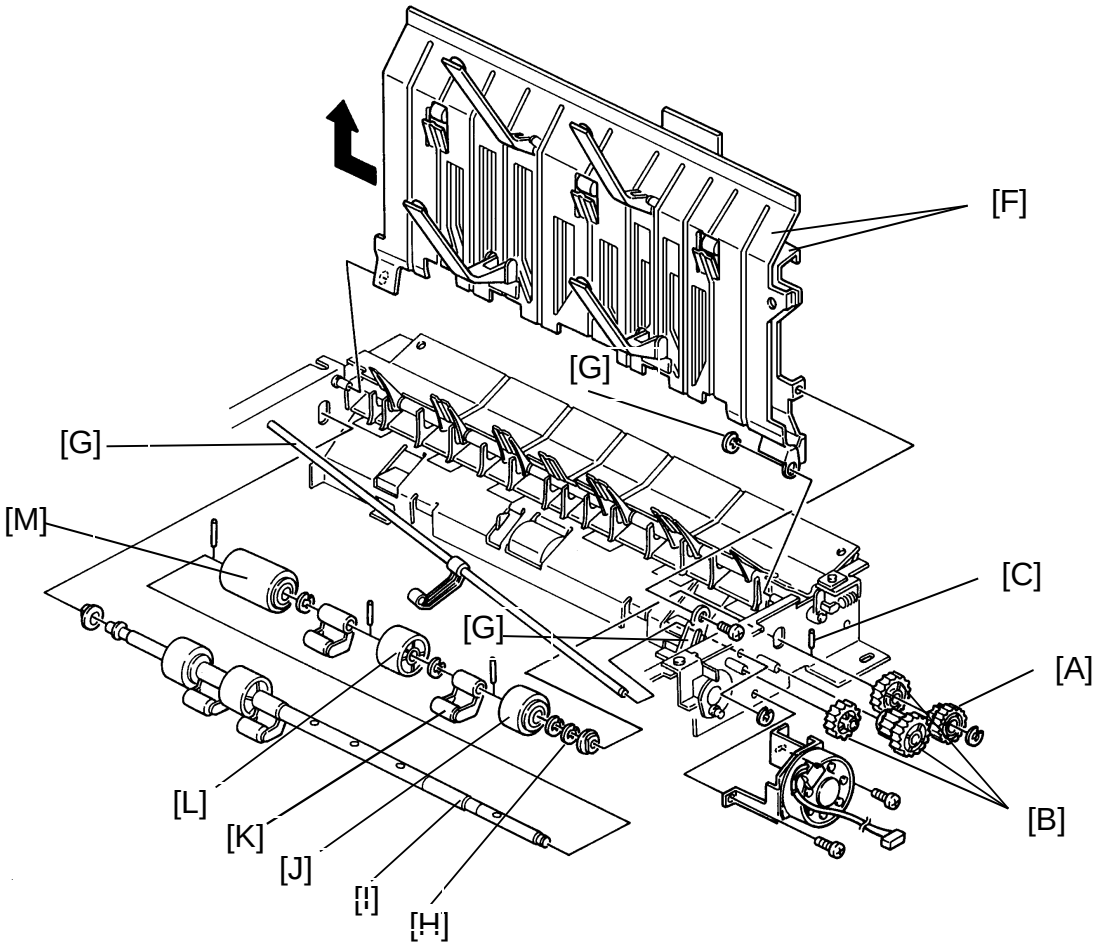
12.8 FRICTION ROLLER REPLACEMENT



1. Remove the duplex unit from the tray. (See Duplex Unit Removal.)
2. Turn over the duplex unit as shown.
3. Unhook the springs [A] from the roller bracket [B].
4. Remove the lock pin [C] and the roller assembly.
5. Remove the roller [D] (1 snap-ring and shaft) from the bracket and replace it.

NOTE: This friction roller has a one-way clutch. Be sure to install the roller so that it rotates in the direction of the arrow. (See illustration.)

12.9 FEED ROLLER REPLACEMENT



1. Remove the duplex unit from the tray. (See Duplex Unit Removal.)
2. Remove the feed motor. (See Feed Motor Replacement.)
3. Remove the drive gear [A] (1 E-ring) and three idle gears [B] (1 parallel pin [C]).
4. Remove the E-ring [D] and the upper paper guide plate stopper [E] (1 shoulder screw).
5. Remove the upper and lower guide paper plates [F].
6. Remove the paper end feeler shaft [G] (1 E-ring).
7. Remove the E-ring [H] on the front side of the feed roller shaft [I].
8. Remove the feed roller shaft (2 bushings).
9. Remove the feed support roller [J], flatter [K], paper retainer [L]; then, replace the feed roller [M] (1 E-ring and parallel pin per roller).

POINTS OF MODEL E TYPE 1 SERVICEABILITY

1. Access to service program mode operation

- There are two ways to access an SP mode.
  (1) By key operation
  (2) By turning on DIP SW101-4 on the main board
- All the SP modes except for the following SP modes can be accessed simply by key operation.
  a. SP #27 A3 (DLT) Double Count
  b. SP #98 Clear Counters
  c. SP #99 Clear All Memory

2. Electrical adjustment and electrical component failure check

- All adjustment, sensor/switch check, and electrical component check except for the following adjustments can be performed by SP mode (key operation).
  a. ADS voltage (Variable resistor on the main board)
  b. ID sensor voltage (Variable resistor on the main board)
  c. Corona currents (Variable resistor on the power pack)
  d. Grid voltage (Variable resistor on the power pack)

3. Less mechanical adjustments

- There are only fem mechanical adjustments.
  a. Doctor gap adjustment
  b. Scanner home position adjustment
  c. 4th/5th mirror home position adjustment
  d. Scanner drive pulley clearance adjustment
  e. Exposure lamp position adjustment
  f. Entrance guide plate height adjustment
  g. Side-to-side registration adjustment

4. Less PM parts (consumable parts) in the fusing section

- The cleaning pad, oil supply pad and oil blade for the oil supply system are not necessary.

5. Replacement of feed rollers

- The replacement procedure for 1st feed rollers will be improved from production units. (See attached copy.)

6. Replacement of ozone filter

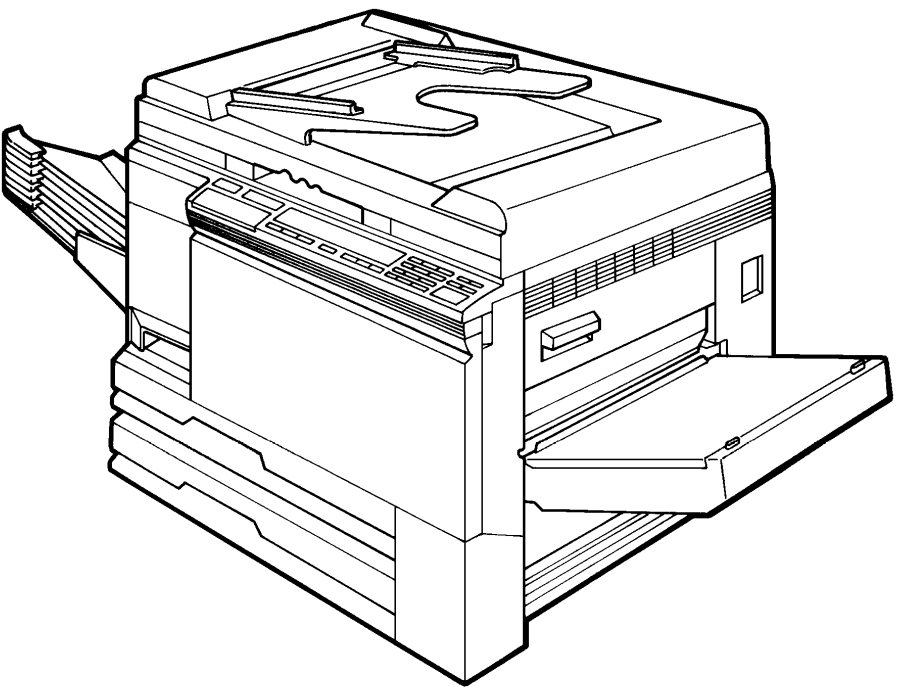
- The ozone filter can be replaced very easily. (See attached copy.)

7. Replacement of parts on the duplex unit

- The duplex unit can be removed from the copier as a module. Therefore, access to the parts are easier.

SECTION 11

FT4421
SERVICE MANUAL



In this section, the FT4418 is referred to as the A048 copier, and the FT4421 is referred to as the A054 Copier.

1. SPECIFICATIONS

Configuration:	Desk top
Copy Process:	Dry electrostatic transfer system
Originals:	Sheet/Book
Original Size:	Maximum A3/11"x17"
Copy Paper Size:	Maximum A3/11"x17" Minimum A6/5 1/2" x 8 1/2" (lengthwise)
(Duplex Copying)	A4 and B5/8 1/2" x 11" (sideways)
Copy Paper Weight:	Cassette feed: 52 to 157 g/m^2 (14 to 42 lb) Paper tray feed: 64 to 90 g/m^2 (17 to 22 lb) Manual feed: 52 to 157 g/m^2 (14 to 42 lb) Duplex: 59 to 104 g/m^2 (16 to 27 lb)
Reproduction Ratio:	2 Enlargement and 3 Reduction

	A4/A3 Version	LT/LDG Version
Enlargement	141% 122%	155% 129%
Full size	100%	100%
Reduction	93% 82% 71%	93% 74% 65%

Zoom:	From 50% to 200% in 1% steps	
Copying Speed:	European version:	20 copies/minute (A4 sideways) 11 copies/minute (A3)
	Other versions:	21 copies/minute (A4/8 1/2" x 11" sideways) 11 copies/minute (A3)
Warm-Up Time:	60 seconds (at 20°C)	
First Copy Time:	5.9 seconds (A4/8 1/2" x 11" sideways)	
Copy Number Input:	Ten keys, 1 to 99 (count up)	
Manual Image Density Selection:	7 steps	

Automatic Reset: 1 minute standard setting; can also be set to 3 minutes or no auto reset.

Paper Capacity:
Cassette: 500 sheets
Paper tray: 250 sheets
Manual feed table: 50 sheets

Toner Replenishment:
Black: Cartridge exchange (370g/cartridge)
Color (red, blue, & green): Cartridge exchange (310g/cartridge)

Copy Tray Capacity:
250 sheets (B4/8 1/2" x 14" and smaller)
100 sheets (A3/11" x 17")

Power Source:
110V/ 60Hz/ 15A (for Taiwan)
115V/ 60Hz/ 15A (for N.A.)
220V/ 50Hz/ 8A (for EU.)
220V/ 60Hz/ 8A (for EU.)
240V/ 50Hz/ 8A (for EU.)
(Refer to the serial number plate (rating plate) to determine the power source required by the machine.)

Power Consumption:
Maximum: 1.3 kw
Warm-up: 0.72 kw (average)
Ready: 0.16 kw (average)
Copy cycle: 0.83 kw (average)

Dimensions:

	Width	Depth	Height
Copier only	672 mm (26.5")	600 mm (23.7")	530 mm (20.9")
Full system	1149 mm (45.3")	600 mm (23.7")	633 mm (25.0")

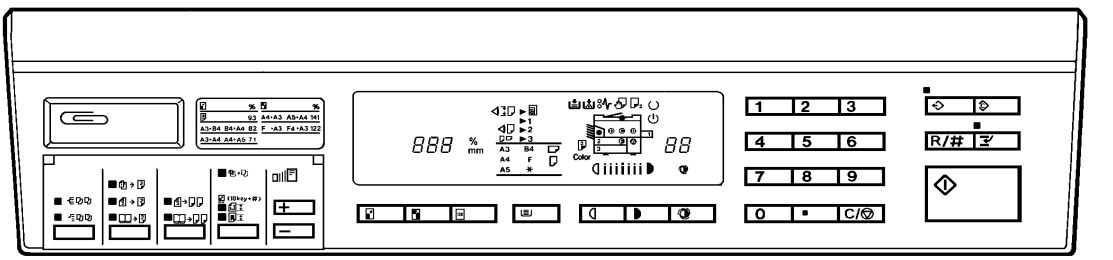
Weight:
Copier only: European version 69 kg (152.1lb)
Other versions 66 kg (145.5lb)
Full system: 86.5 (190.7lb)

Optional Equipment:
Document feeder
10 bin sorter
Duplex unit (standard for European version)
Color development unit
Key counter
Universal cassette

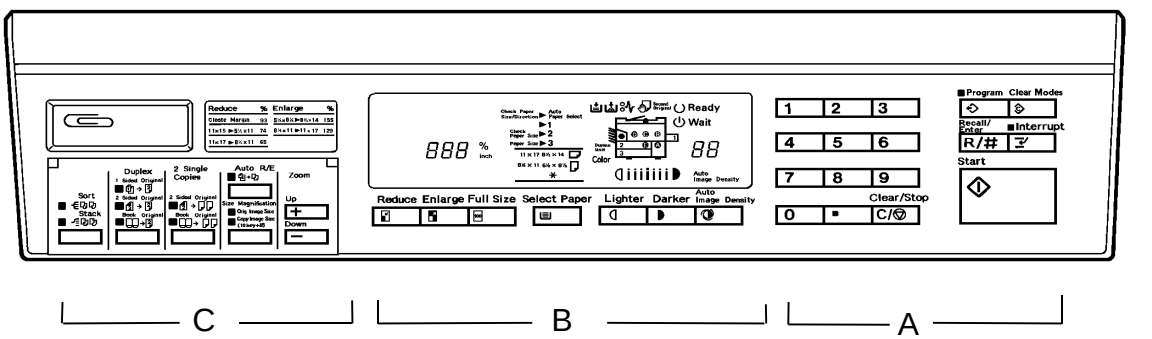
•Specifications are subject to change without notice.

2. OPERATION PANEL

— A4/A3 Version —



— LT/LDG Version —



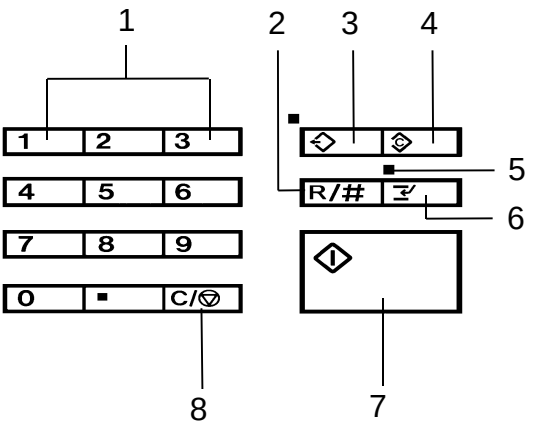
Section A: See page 11-4.

Section B: See page 1-5 or 1-6.

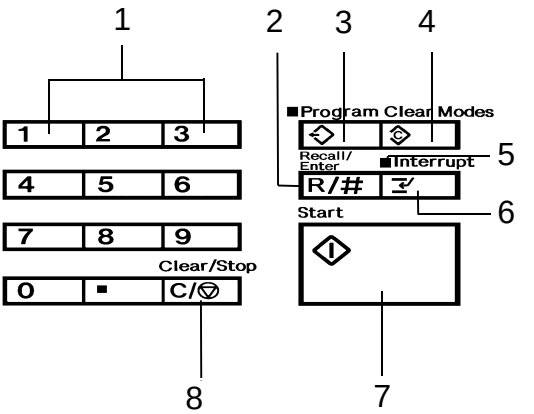
Section C: See page 1-7 or 1-8.

Section A —

— A4/A3 Version —



— LT/LDG Version —



1. Number Keys
The number keys are used to enter the desired number of copies. They are also used to input the sizes of the original and the copy image when in size magnification mode.

2. Recall/Enter Key
Press to display the number of copies entered. Also use to enter or change data when in size magnification mode.

3. Program Key
Press to input or recall user programs.

4. Clear Modes Key
Press to clear all previously entered settings and modes.

5. Interrupt Indicator
Lights when interrupt mode is selected.

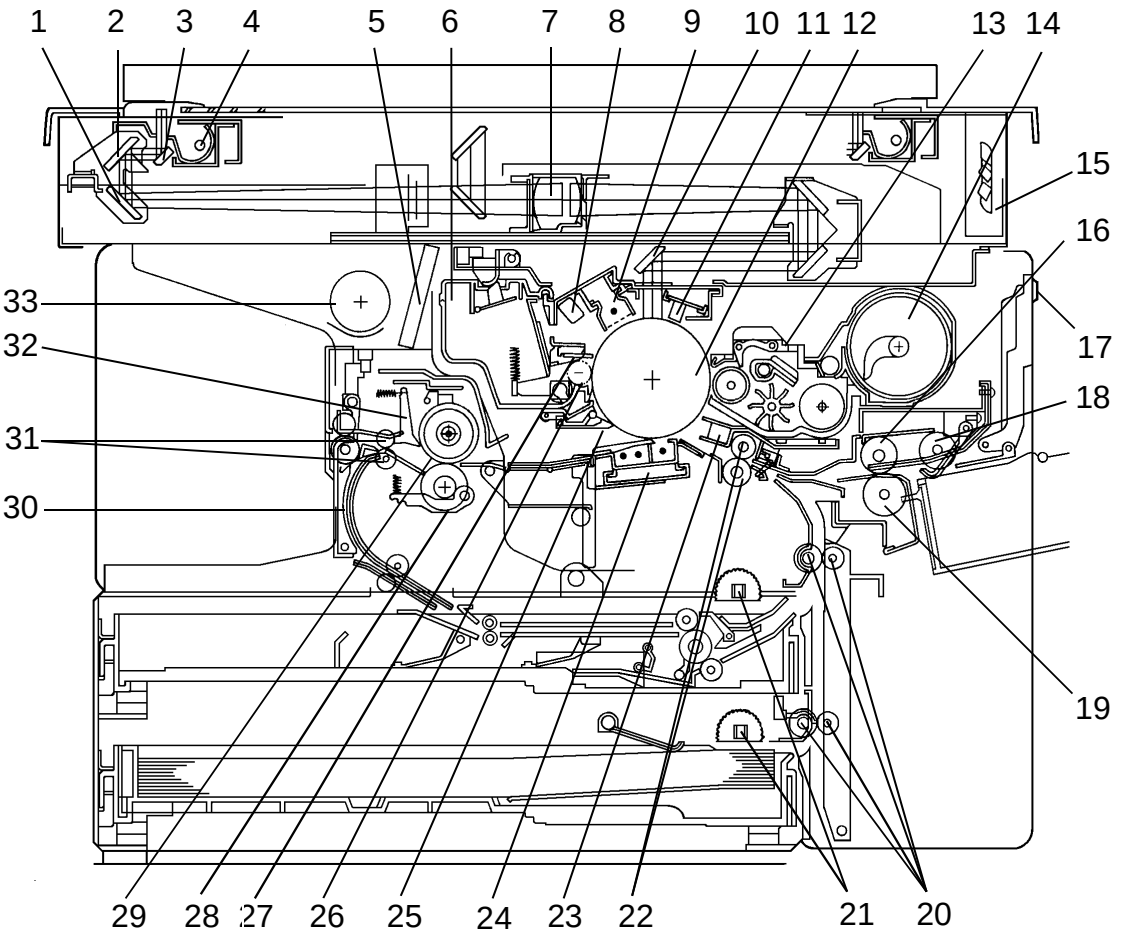
6. Interrupt Key
Press to make interrupt copies during a copy run.

7. Start Key
Press to start copying.

8. Clear/Stop Key
Press to cancel the copy number entered. While copying, press to stop copying.

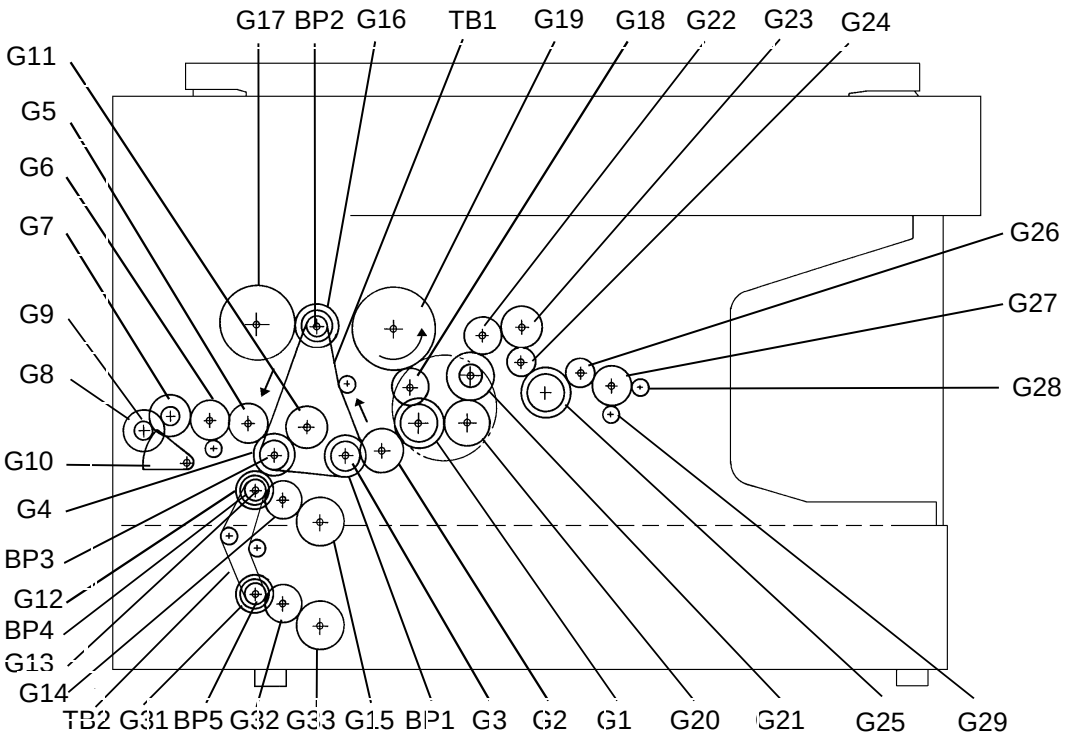
3. FUNCTIONAL OPERATION

4. MECHANICAL COMPONENT LAYOUT



1. Third Mirror
2. Second Mirror
3. First Mirror
4. Exposure Lamp
5. Ozone Filter
6. Cleaning Unit
7. Lens
8. Quenching Lamp (QL)
9. Charge Corona Unit
10. Sixth Mirror
11. Erase lamp (EL)
12. OPC Drum
13. Development Unit
14. Toner Supply Unit
15. Optics Cooling Fans
16. Feed Roller
17. Manual Feed Table
18. Pick-up Roller
19. Separation Roller
20. Relay Rollers
21. Semi-circular Feed Rollers
22. Registration Rollers
23. Pre-transfer Lamp (PTL)
24. Transfer and Separation Corona Unit
25. Pick-off Pawls
26. Cleaning Brush
27. Cleaning Blade
28. Pressure Roller
29. Hot Roller
30. Duplex Turn Guide (Standard only for European version)
31. Exit Rollers
32. Hot Roller Strippers
33. Exhaust Blower

5. DRIVE LAYOUT



G1: Main Motor Gear → G20: Relay Gear

G2: Relay Gear

G3: Timing Belt Drive Gear

BP1: Timing Belt Pulley

TB1: Timing Belt → Development Section

A

G18: Relay Gear

G19: Drum Drive Gear

Drum

BP2: Timing Belt Pulley

G16: Development CL Gear

Development CL → Development Unit

G17: Toner Supply CL Gear

Toner Supply CL → Toner Supply Unit

G21: Cleaning Drive → Cleaing Unit

G22: Relay Gear

Fusing and Exit Section

G23: Relay Gear

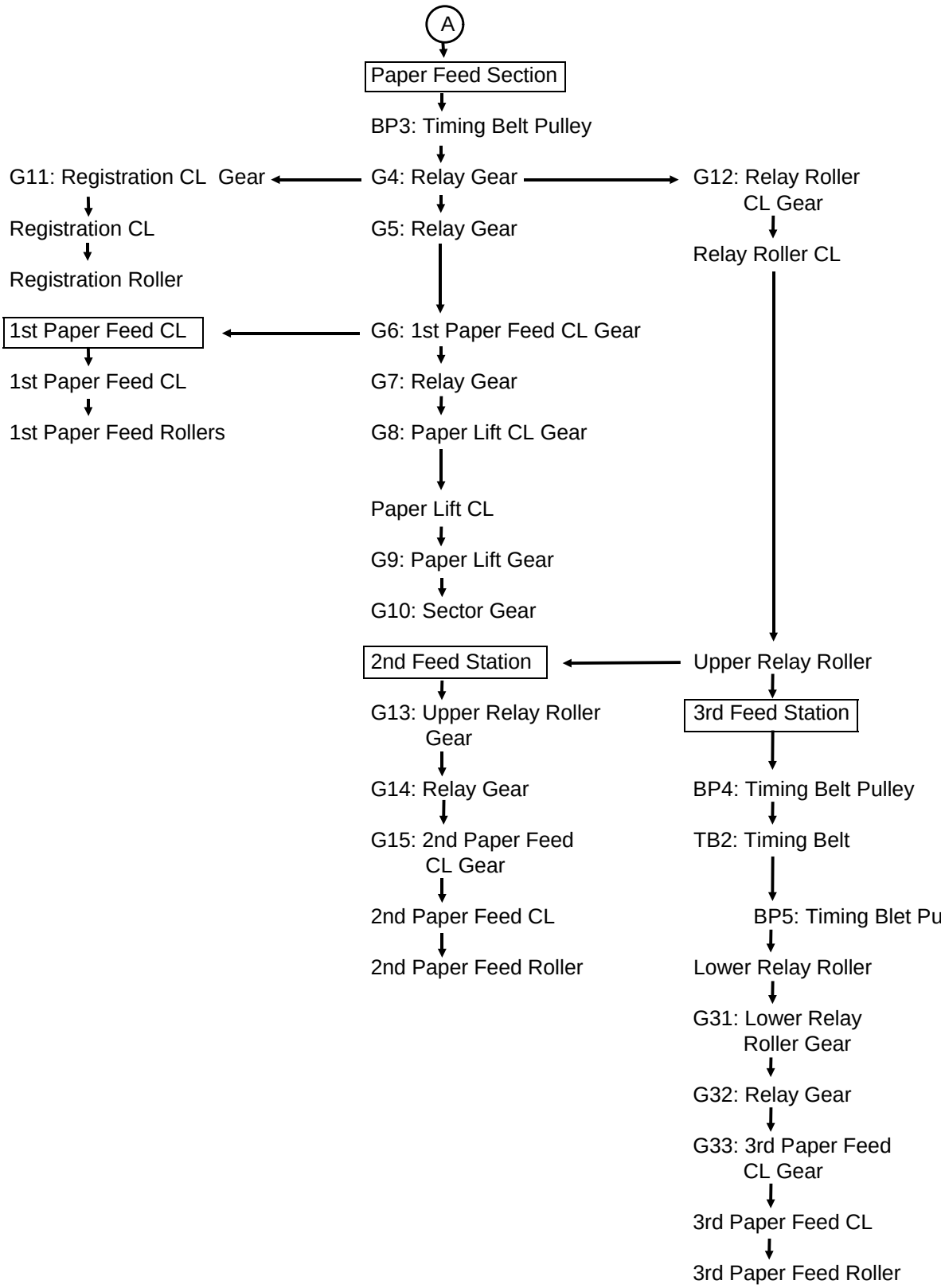
G24: Relay Gear

G25: Hot Roller Gear

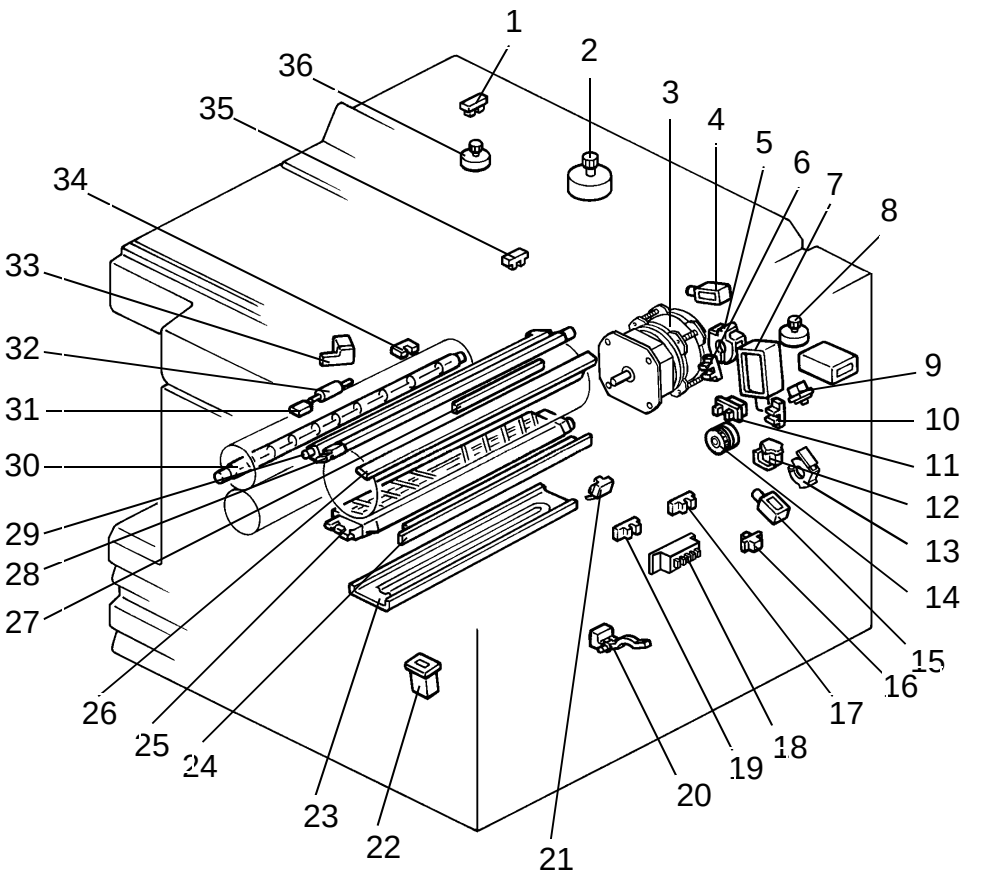
G26: Relay Gear

G27: Relay Gear → G29: Duplex Tranport Gear (Standard only for European versio

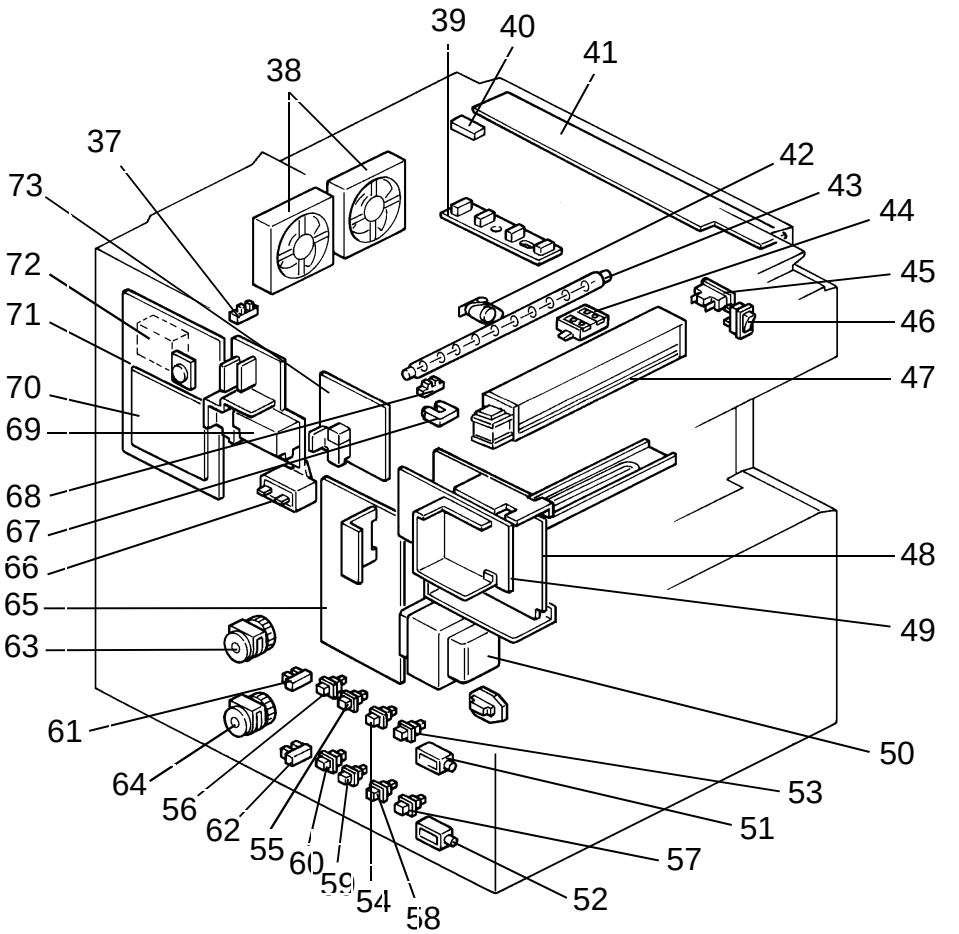
G28: Exit Roller Gear


A
Paper Feed Section
BP3: Timing Belt Pulley
G4: Relay Gear
G11: Registration CL Gear
G12: Relay Roller CL Gear
Registration CL
Registration Roller
G5: Relay Gear
Relay Roller CL
1st Paper Feed CL
G6: 1st Paper Feed CL Gear
1st Paper Feed CL
1st Paper Feed Rollers
G7: Relay Gear
G8: Paper Lift CL Gear
Paper Lift CL
G9: Paper Lift Gear
G10: Sector Gear
2nd Feed Station
Upper Relay Roller
G13: Upper Relay Roller Gear
3rd Feed Station
G14: Relay Gear
BP4: Timing Belt Pulley
G15: 2nd Paper Feed CL Gear
TB2: Timing Belt
2nd Paper Feed CL
BP5: Timing Blet Pu
2nd Paper Feed Roller
Lower Relay Roller
G31: Lower Relay Roller Gear
G32: Relay Gear
G33: 3rd Paper Feed CL Gear
3rd Paper Feed CL
3rd Paper Feed Roller

6. ELECTRICAL COMPONENT LAYOUT



1. Scanner H.P. Sensor
2. Scanner Motor
3. Main Motor
4. Development CL Sol.
5. Toner Supply CL Sol.
6. Toner End Sensor
7. Pick-up Roller Release Sol.
8. 4th/5th Mirror Motor
9. Manual Feed Table SW
10. Development Unit Set Sensor
11. Color Switch
12. 1st Paper Feed CL Sol.
13. Paper Lift CL Sol.
14. Registration Clutch
15. Relay Roller CL Sol.
16. Right Cover SW
17. 1st Paper End Sensor
18. 1st Paper Size SW
19. Paper Lift Sensor
20. Relay Sensor
21. Registration Sensor
22. Total Counter
23. Drum Anti-condensation Heater
24. Pre-transfer Lamp (PTL)
25. Transfer and Separation Corona Unit
26. Erase Lamp (EL)
27. ID Sensor
28. Charge Corona Unit
29. Quenching Lamp (QL)
30. Fusing Lamp
31. Fusing Thermister
32. Fusing Thermofuse
33. Auto ID Sensor
34. Toner Overflow Sensor
35. Exit Sensor
36. Lens Motor



37. 4th/5th Mirror H.P. Sensor
38. Optics Cooling Fan Motors
39. Original Length Sensor
40. Platen Cover Closed SW
41. Operation Panel Board
42. Optics Thermoswitch
43. Exposure Lamp
44. Original Width Sensor
45. Cover Safety SW
46. Main SW
47. Exhaust Blower Motor
48. Main DC Power Supply Board
49. Option DC Power Supply Board
50. Main Transformer
51. Upper Tray Lock Sol.
52. Lower Tray Lock Sol.
53. 2nd Paper Size SW-4 (SW7)
54. 2nd Paper Size SW-3 (SW6)
55. 2nd Paper Size SW-2 (SW5)
56. 2nd Paper Size SW-1 (SW4)
57. 3rd Paper Size SW-4 (SW14)
58. 3rd Paper Size SW-3 (SW13)
59. 3rd Paper Size SW-2 (SW12)
60. 3rd Paper Size SW-1 (SW11)
61. 2nd Paper End Sensor
62. 3rd Paper End Sensor
63. 2nd Paper Feed CL Sol.
64. 3rd Paper Feed CL Sol.
65. Main Motor Capacitor
66. AC Drive Board
67. Platen Cover Position Sensor
68. Lens H.P. Sensor
69. TC/SC Power Pack
70. Interface Board
71. Main Board
72. Key Counter (Option)
73. CC/Grid/Bias Power Pack

7. ELECTRICAL COMPONENT DESCRIPTIONS

SYMBOL	NAME	FUNCTION	INDEX NO.
Motors			
M1	Main Motor	Drives all the main unit components except for the optics unit and fans. (115/220/240Vac)	3
M2	Scanner Motor	Drives the scanners (1st and 2nd). (dc stepper)	2
M3	Lens Motor	Moves the lens position according to the selected magnification. (dc stepper)	36
M4	4th/5th Mirror Motor	Move the 4th/5th mirror position according to the selected magnification. (dc stepper)	8
M5	Optics Cooling Fan Motor-1	Prevents built up of hot air in the optics cavity. (24 Vdc)	38
M6	Optics Cooling Fan Motor-2	Prevents built up of hot air in the optics cavity. (24 Vdc)	38
M7	Exhaust Blower Motor	Removes heat from around the fusing unit and blower the ozone built up around the charge section to the ozone filter.	47
Magnetic Clutches			
MC1	Registration Clutch	Drives the registration roller.	14
Solenoids			
SOL1	Toner Supply Clutch Solenoid	Drives the toner supply roller via the toner supply spring clutch.	5
SOL2	1st Paper Feed Clutch Solenoid	Starts paper feed from the first paper station.	12
SOL3	2nd Paper Feed Clutch Solenoid	Starts paper feed from the 2nd paper station.	63
SOL4	Pick-up Roller Release Solenoid	a) After the paper is fed, releases the pick-up roller from next paper. b) When the manual feed table is used, releases the pick-up roller from the table.	7
SOL5	Paper Lift Clutch Solenoid	Lifts paper to the appropriate feed position.	13
SOL6	Upper Tray Lock Solenoid	Locks the upper paper tray/duplex unit.	51
SOL7	Development Clutch Solenoid	Drives the development unit.	4
SOL8	Relay Roller Clutch Solenoid	Drives the relay roller for the 2nd cassette station.	15

SYMBOL	NAME	FUNCTION	INDEX NO.
SOL9	3rd Paper Feed Clutch Solenoid	Starts paper feed from the 3rd paper station.	64
SOL10	Lower Tray Lock Solenoid	Locks the lower paper tray.	52

Switches

SW1	Main Switch	Supplies power to the copier.	46
SW2	Cover Safety Switch	Cuts the ac power line.	45
SW3	1st Paper Size Switch	Determines what size paper is in the cassette.	18
SW4	2nd Paper Size Switch-1	Determines what size paper is in the upper paper tray.	56
SW5	2nd Paper Size Switch-2	Determines what size paper is in the upper paper tray.	55
SW6	2nd Paper Size Switch-3	Determines what size paper is in the upper paper tray.	54
SW7	2nd Paper Size Switch-4	Determines what size paper is in the upper paper tray.	53
SW8	Color Switch	Determines which color development unit is installed.	11
SW9	Manual Feed Table Switch	Detects when the manual feed table is open.	9
SW10	Right Cover Switch	Detects when the right cover is open.	16
SW11	3rd Paper Size Switch-1	Determines what size paper is in the lower tray.	60
SW12	3rd Paper Size Switch-2	Determines what size paper is in the lower tray.	59
SW13	3rd Paper Size Switch-3	Determines what size paper is in the lower tray.	58
SW14	3rd Paper Size Switch-4	Determines what size paper is in the lower tray.	57
SW15	Platen Cover Closed Switch	Detects when the platen cover or the document feeder is closed.	40

Sensors

S1	Scanner Home Position Sensor	Informs the CPU when the 1st scanner is at the home position.	1
S2	Lens Home Position Sensor	Informs the CPU when the lens is at the home position (full size position).	68

SYMBOL	NAME	FUNCTION	INDEX NO.
S3	4th/5th Mirror Home Position Sensor	Informs the CPU when the 3rd scanner (4th/5th mirrors assembly) is at the home position (full size position).	37
S4	Registration Sensor	Detects misfeeds.	21
S5	Exit Sensor	Detects misfeeds.	35
S6	1st Paper End Sensor	Informs CPU when the cassette runs out of paper.	17
S7	2nd Paper End Sensor	Informs CPU when the upper paper tray runs out of paper.	61
S8	Toner End Sensor	Detects when it is time to add toner.	6
S9	Toner Overflow Sensor	Detects when the used toner tank is full.	34
S10	Paper Lift Sensor	Detects the correct feed height of the cassette.	19
S11	Image Density (ID) Sensor	Detects the density of the image on the drum to control the toner density.	27
S12	Development Unit Set Sensor	Sensors whether or not the development unit is properly set.	10
S13	3rd Paper End Sensor	Informs CPU when the lower paper tray runs out of paper.	62
S14	Relay Sensor	Detects imsfeeds.	20
S15	Platen Cover Position Sensor	Detects when the platen cover is positioned about 10 cm (4") above the exposure glass.	67
S16	Original Width Sensor	Detects the original width.	44
S17	Original Length Sensor	Detects the original length.	39

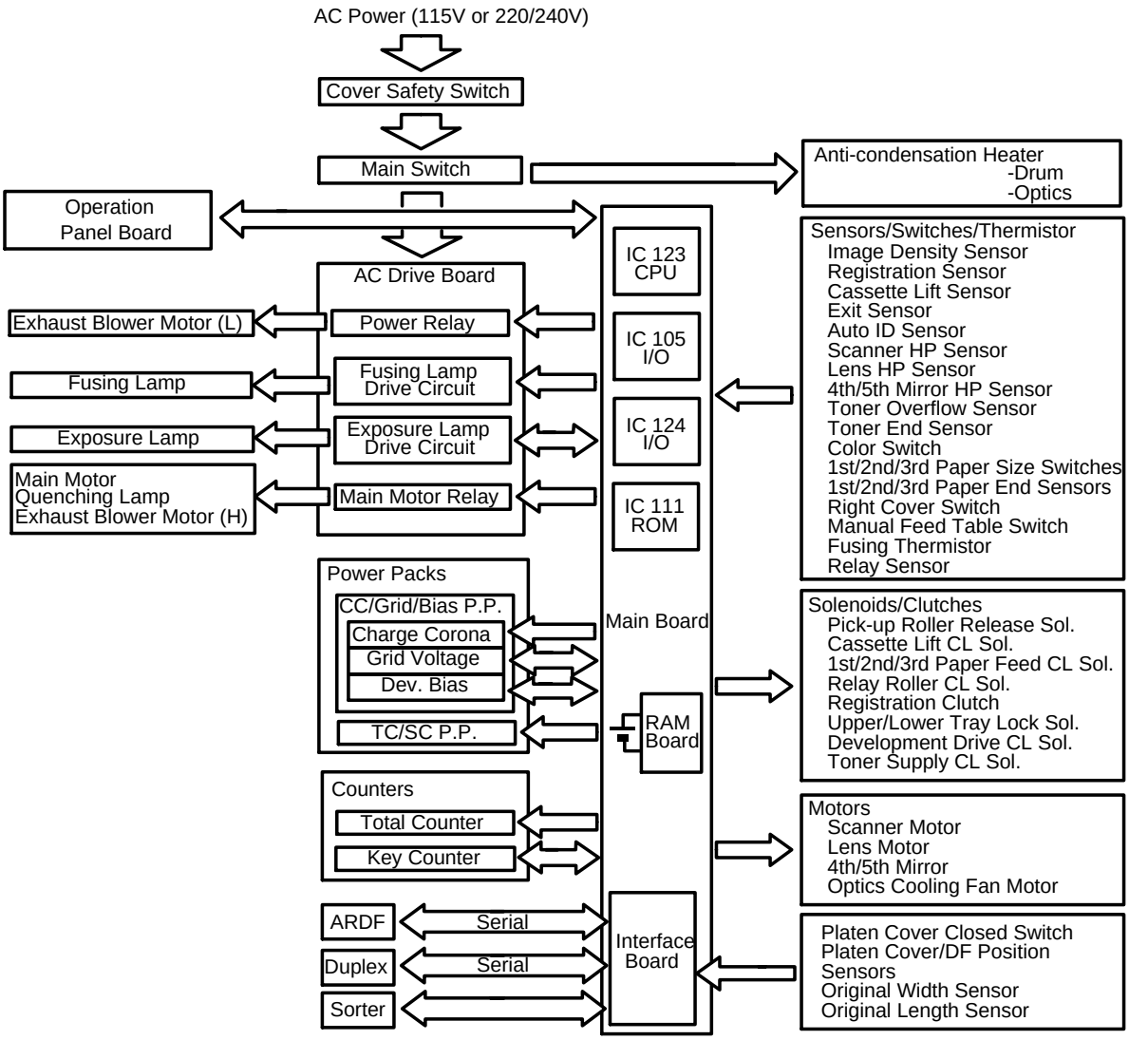
Printed Circuit Boards

PCB1	Main Board	Controls all copier functions both directly and through the other PCBs.	71
PCB2	AC Drive Board	Drives all ac motors, the exposure lamp, fusing lamp, quenching lamp, exhaust blower motor.	65
PCB3	Main DC Power Supply Board	Rectifies 26 and 10 Vac input and outputs dc voltages.	48
PCB4	Auto Image Density Sensor (ADS)	Senses the background density of the original.	33

SYMBOL	NAME	FUNCTION	INDEX NO.
PCB5	Option DC Power Supply Board	Rectifies 26 and 10 Vac input and outputs dc voltasges.	49
PCB6	Interface Board	Interfaces between the copier main board and all the optional equipment's main board.	70
PCB7	Operation Panel Board	Informs the CPU of the selected modes and displays the situations on the panel.	41
Lamps			
L1	Exposure Lamp	Applies high intensity light to the original for exposure.	43
L2	Fusing Lamp	Provides heat to the hot roller.	30
L3	Quenching Lamp	Neutralizes any charge remaining on the drum surface after cleaning.	29
L4	Erase Lamp	Discharge the drum outside of the image area. Provides leading/trailing edge erase.	26
L5	Pre-transfer Lamp	Reduces charge on the drum surface before transfer.	24
Power Packs			
P1	CC/Grid/Bias Power Pack	Provides high voltage for the charge corona, grid, and the development roller bias.	73
P2	TC/SC Power Pack	Provides high voltage for the transfer and separation corona.	69
Heaters			
H1	Drum Anti-condensation Heater	Prevents moisture around the drum.	23
H2	Optics Anti-condensation Heater Option	Prevents moisture from forming on the optics.	N/A
Counters			
CO1	Total Counter	Keeps track of the total number of copies made.	22
CO2	Key Counter (Option)	Used for control of authorized use. Copier will not operate until installed.	72
Transformer			
TR1	Main Transformer	Steps down the wall voltage to 26 Vac and 10 Vac.	50

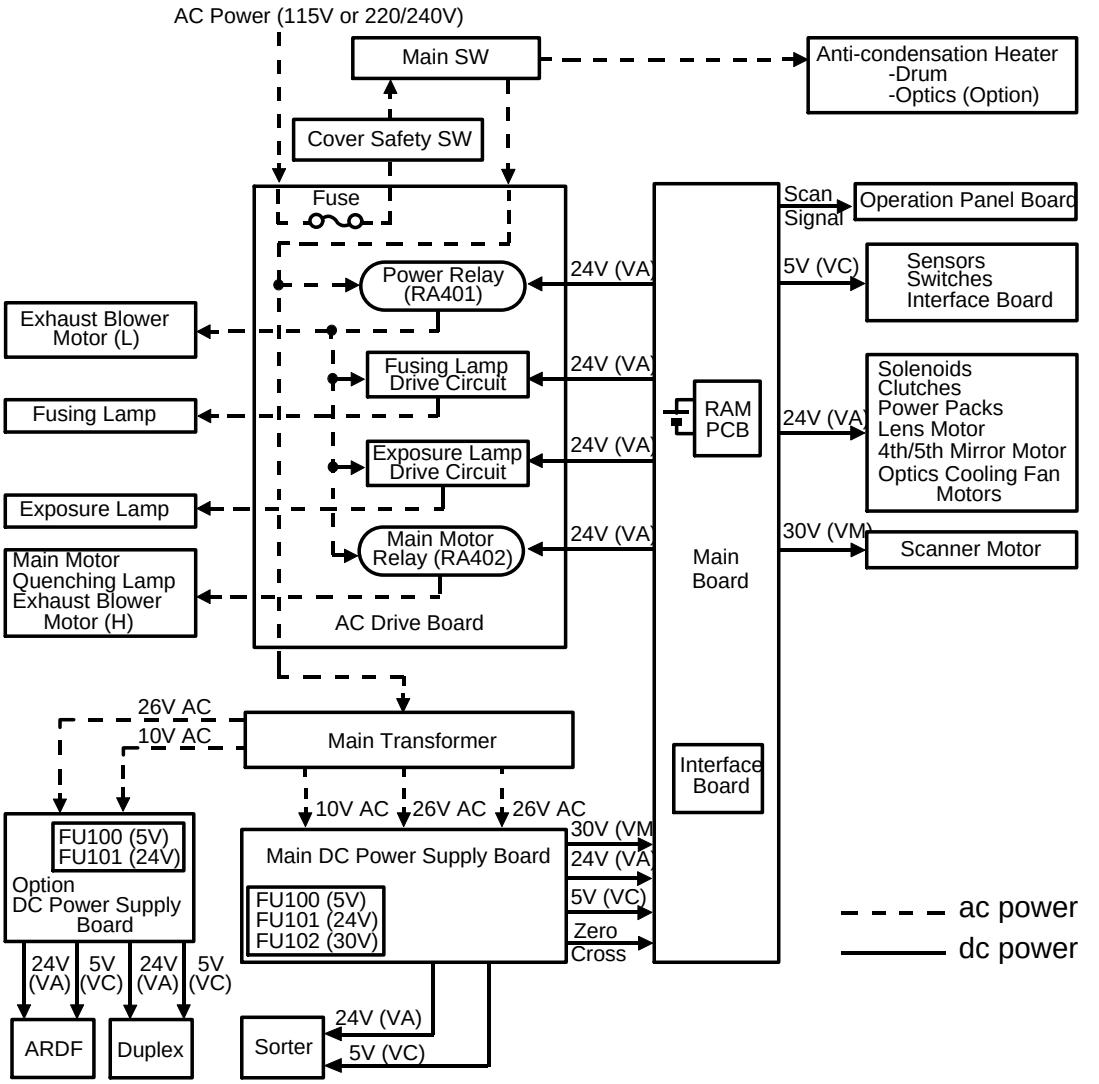
SYMBOL	NAME	FUNCTION	INDEX NO.
Others			
TH	Fusing Thermistor	Monitors the fusing temperature.	31
TF	Fusing Thermofuse	Provides back-up overheat protection in the fusing unit.	32
TS	Optics Thermoswitch	Provides back-up overheat protection around the exposure lamp.	42
C	Main Motor Capacitor	Start capacitor	66

8. OVERALL MACHINE CONTROL



The above diagram shows the control system of this copier in block form. The CPU (IC123) on the main board controls the timing of all copier's operation based on the CPU's internal clock. The CPU monitors the input signals from all sensors and controls the dc components directly or through two I/O chips (IC 105 and IC 124). It also controls ac components such as the fusing lamp, exposure lamp, main motor quenching lamp, and exhaust blower motor (High speed) directly via the ac drive board. The exhaust blower motor (Low speed) is controlled via the I/O chip (IC 124) and ac drive board. The charge corona, grid voltage and development bias are powered by the same power pack (P1) but are controlled separately as shown above. The main board has a RAM board for the service program mode and misfeed recovery. A battery backs up the power to the RAM board.

9. AC POWER AND DC POWER DISTRIBUTION



When this copier is plugged in and the main switch is turned off, ac power is supplied via the ac drive board to the anti-condensation heater. When the front cover and/or the exit cover is open, the cover safety switch completely cuts off power to all ac and dc components. The RAM board has a back up power supply (dc battery) for the service program mode and misfeed job recovery.

When the main switch is turned on, the ac power supply to the anti-condensation heater is cut off and ac power is supplied to the ac drive board. The main transformer receives wall outlet ac power through the ac drive board and outputs 10 volts ac and 26 volts ac to the main dc power supply board and the option dc power supply board.

The main dc power supply board converts the 10 volts ac input to +5 volts and a zero cross signal. There are two 26 volts ac inputs. The dc power supply board converts them to +24 volts and +30 volts.

The +5 volts and +24 volts are supplied to both the copier main board and the sorter main board. The zero cross signal and +30 volts are supplied to the copier main board.

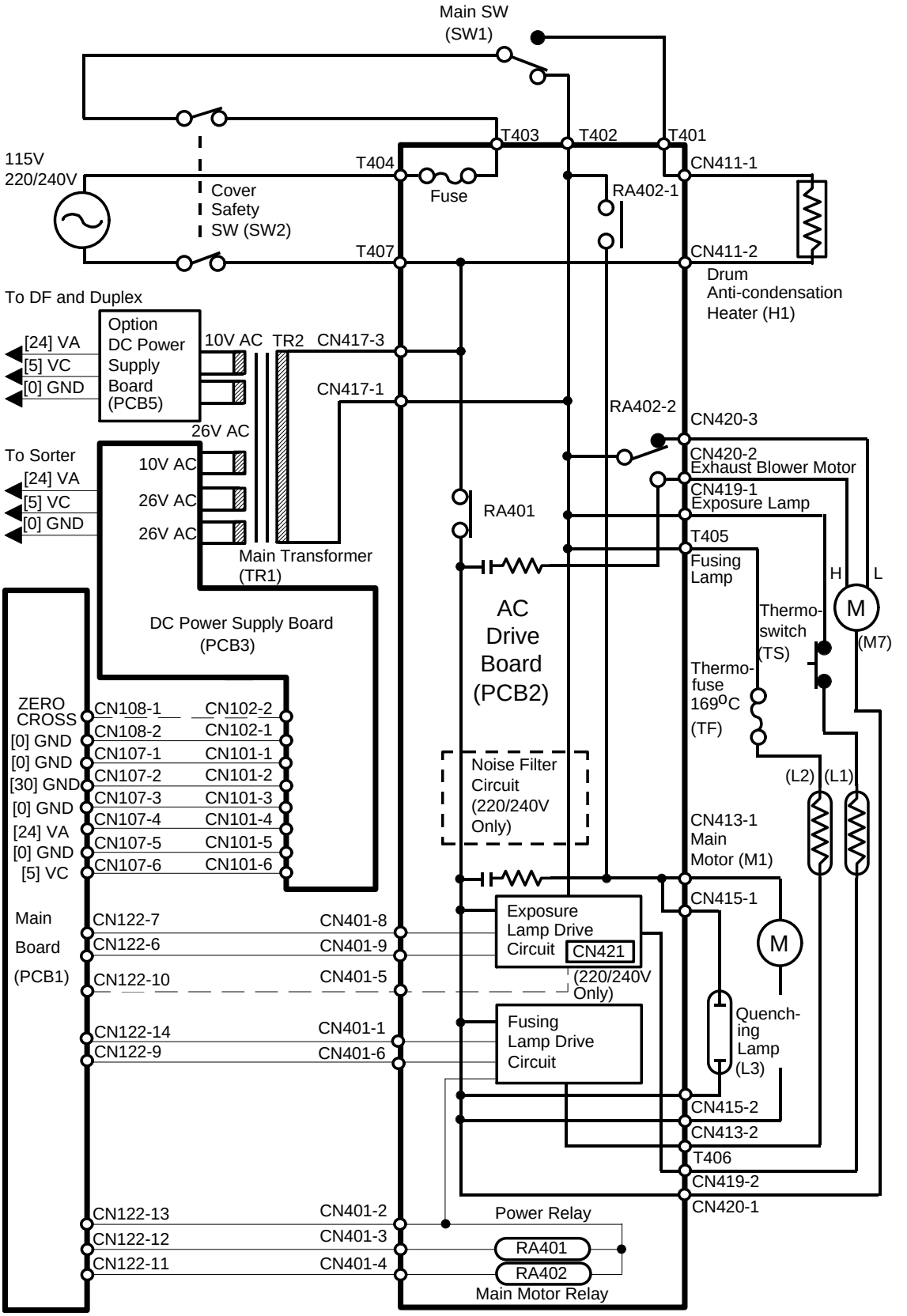
The copier main board supplies dc powers to all copier dc components. All sensors, and switches plus the interface board operate on +5 volts. The scanner motor operates on +30 volts. All other dc components including the power relay (RA401) and the main motor relay (RA402) operate on +24 volts. The ARDF and the duplex unit have a separate dc power supply.

When the main board receives power, it activates the power relay (RA401) which then supplies ac power to the fusing lamp drive circuit, and the exposure lamp drive circuit on the ac drive board. The exhaust blower motor begins rotating at low speed. The fusing lamp drive circuit receives a trigger signal from the main board and the fusing lamp lights. The exposure lamp does not turn on until the main board send a trigger pulse to the exposure lamp drive circuit.

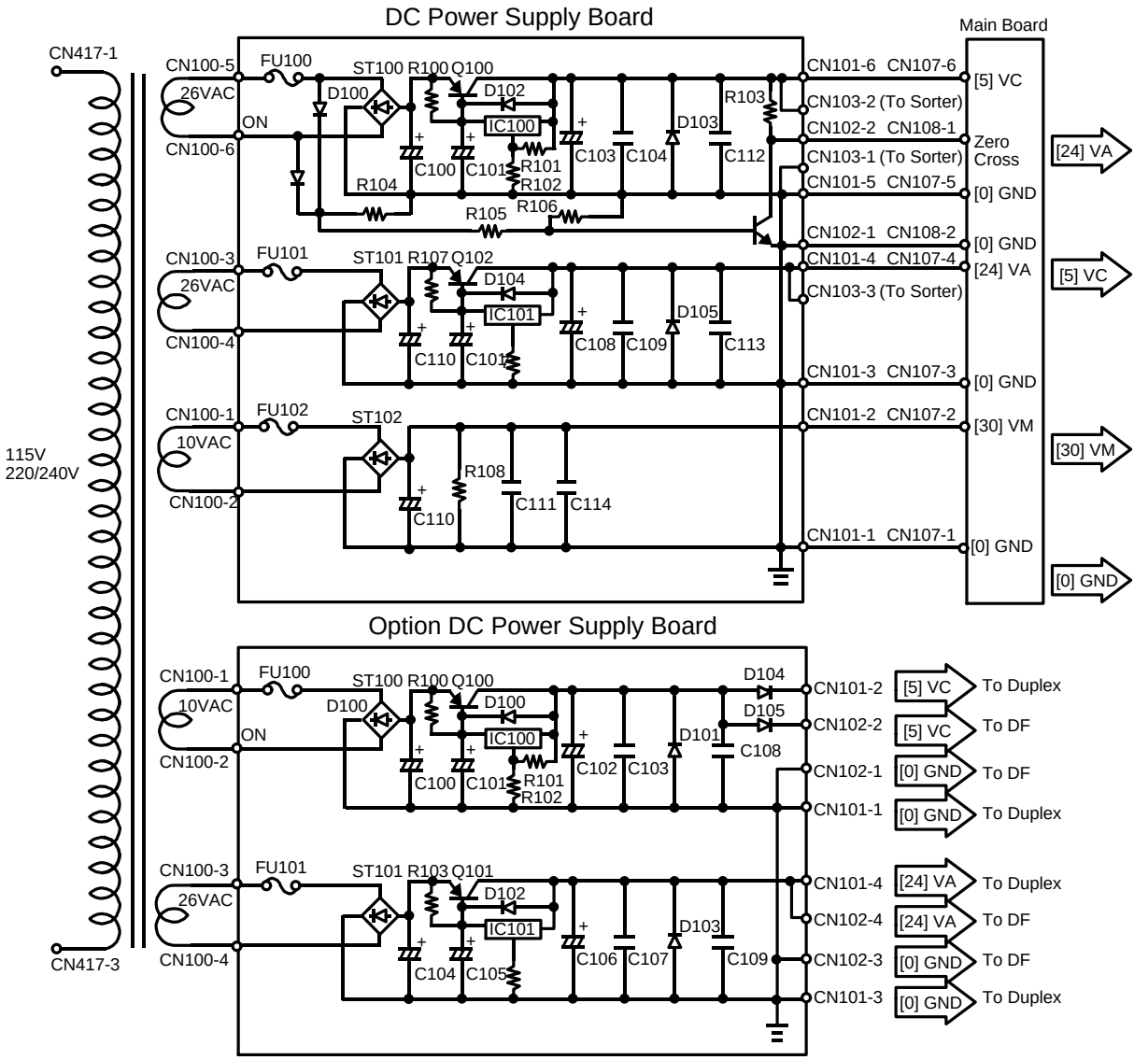
When the Start key is pressed, the main board energizes the main motor relay (RA402). Then, the main motor and the quenching lamp turn on and the exhaust blower starts rotating at high speed.

When the main switch is turned off, power is cut off to the main board and to RA401, and the drum and optional anticondensation heaters are turned on. The exposure lamp and the fusing lamp power lines are completely disconnected from the line voltage.

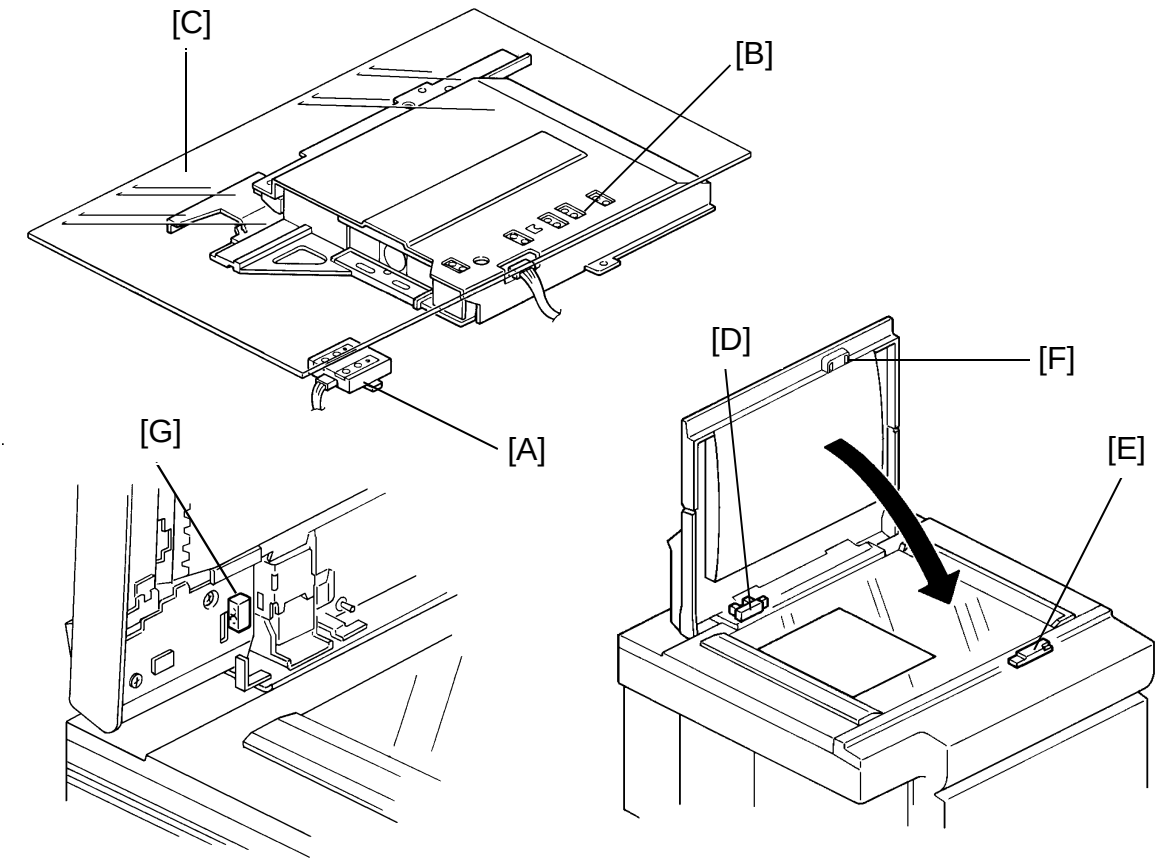
9.1 AC POWER DISTRIBUTION



9.2 DC POWER DISTRIBUTION



10. ORIGINAL SIZE DETECTION IN PLATEN MODE



An original width sensor [A] and an original length sensor [B] are under the exposure glass [C]. The original width sensor consists of two reflective photosensors. The original length sensor consists of four reflective photosensors.

While the main switch is on, these sensors are active and the CPU receives their output signals through the interface board. The CPU checks the output signals twice as the platen cover (document feeder) is being closed.

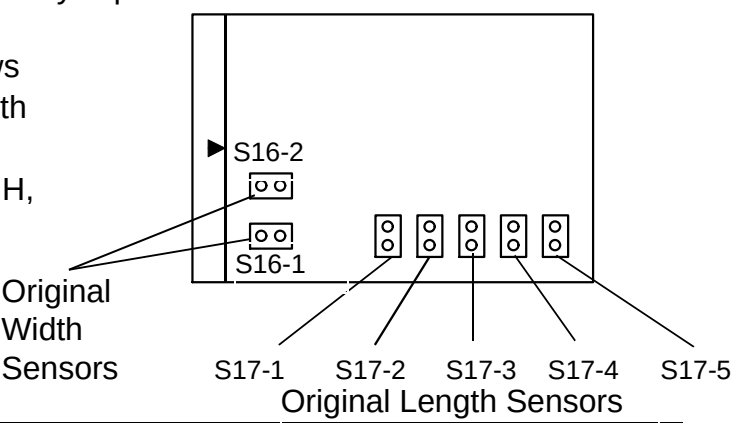
The first check is done when the platen cover position sensor [D] turns on. (When the document feeder is installed, the first check is done when the DF position sensor [G] on the document feeder turns on.) The platen cover position sensor is actuated when the platen cover (document feeder) is lowered to about 10 cm (4") above the exposure glass. At this time only the sensors located underneath the original receive the reflected light. These sensors output LOW signals.

The second check is done when the platen cover closed switch [E] turns on. This is when the platen cover (document feeder) is completely closed. The platen cover closed switch is a lead switch. A magnet [F] mounted on the platen cover (document feeder) actuates the lead switch.

The second check is necessary to confirm that the original size detected at the first check is correct. At the second check, all sensors should output LOW signals because the platen cover sheet (document feeder belt) is white. This double check prevents original size detection errors that may occur if a black solid area on the original is positioned directly over a sensor.

When a copy with the platen cover (document feeder) open, the CPU checks the original size when the Print key is pressed.

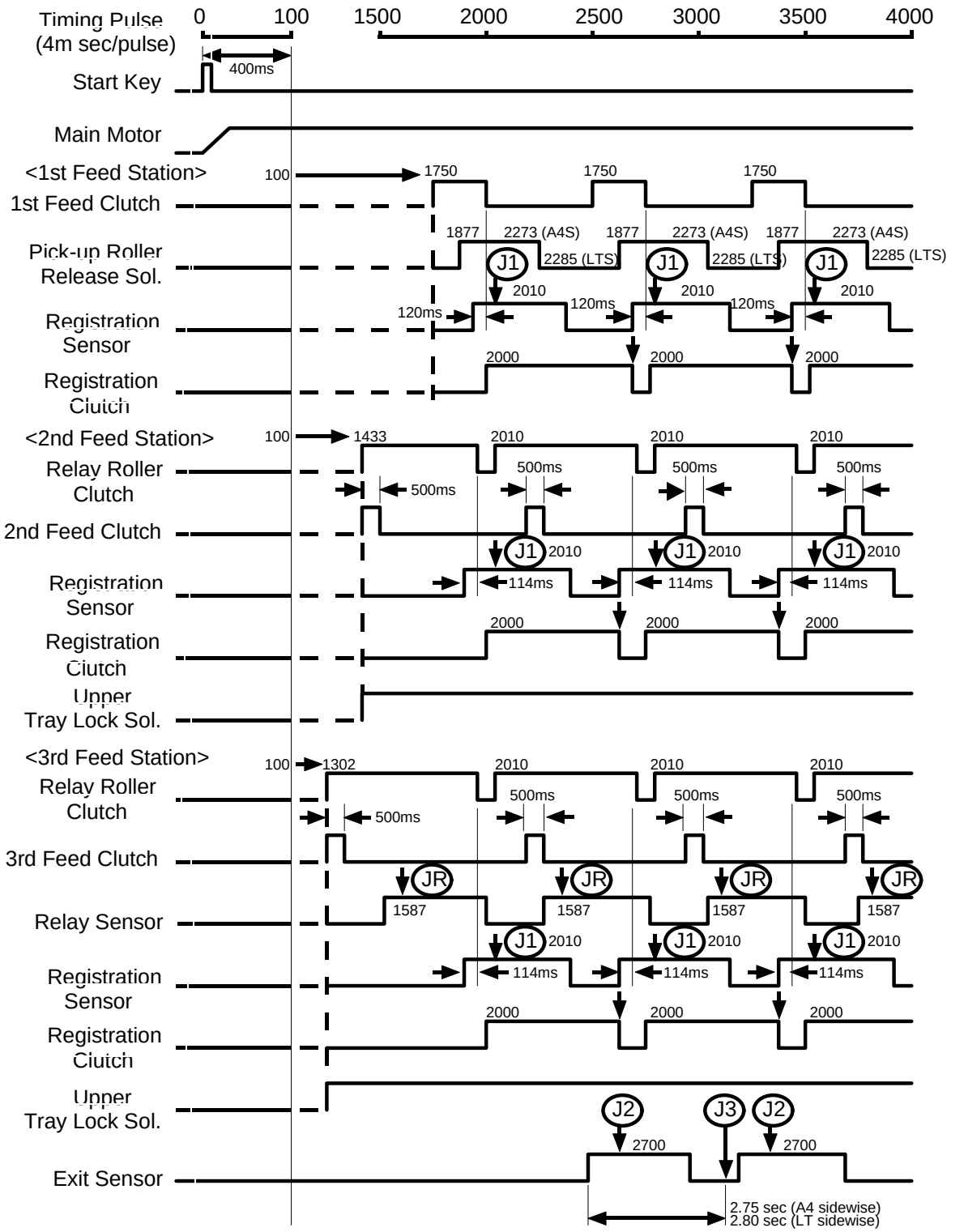
The following illustration shows the location of the original width and length sensors. The table shows the sensor output (HIGH, LOW) for each original size.



Original Size \ Sensors		Original Width Sensor		Original Length Sensor				
		S16-1	S16-2	S17-1	S17-2	S17-3	S17-4	S17-5
A3	11" x 17"	0	0	0	0	0	0	0
B4	11" x 15" 10" x 14"	0	0	0	0	0	0	1
—	8 1/2" x 14"	1	0	0	0	0	0	1
A4 lengthwise	8 1/2" x 11"	1	0	0	0	1	1	1
B5 lengthwise or smaller	8" x 10"	1	0	0	1	1	1	1
A5 lengthwise	5 1/2" x 8 1/2" or smaller	1	1	1	1	1	1	1
A4 lengthwise or smaller	11" x 8 1/2"	0	0	0	1	1	1	1
B5 sideways	8 1/2" x 5 1/2"	0	0	1	1	1	1	1
A5 sideways or smaller	8 1/2" x 5 1/2" or smaller	1	0	1	1	1	1	1

0: LOW 1: HIGH

11. PAPER FEED AND MISFEED DETECTION TIMING



The registration sensor, the exit sensor and the relay sensor monitor the movement of the paper through the paper path. If the CPU determines that a misfeed exists, the Check Paper Path and the Misfeed Location indicators turn on. When the main switch is turned on, the CPU checks these three sensors for initial misfeed. During the copy cycle, the CPU performs three kinds of misfeed detection:

J1: Checks whether the registration sensor is actuated within 10 pulses (40 milliseconds) after the registration clutch turns on. (The Misfeed Location indicator "A" or "B" turns on.)

J2: Checks whether the exit sensor is actuated within 700 pulses (2.8 seconds) after the registration clutch turns on. (The Misfeed Location indicator "C" turns on.)

J3: Checks whether the copy paper has passed through the exit sensor 2.75 (A4 sideways) or 2.80 (Letter sideways) seconds after the exit sensor has been actuated. (The Misfeed Location indicator "D" turns on.)

JR: Checks whether the relay sensor is actuated within 285 pulses (1.14 seconds) after the 3rd feed clutch turns on. (The Misfeed Location indicator "A" turns on.)

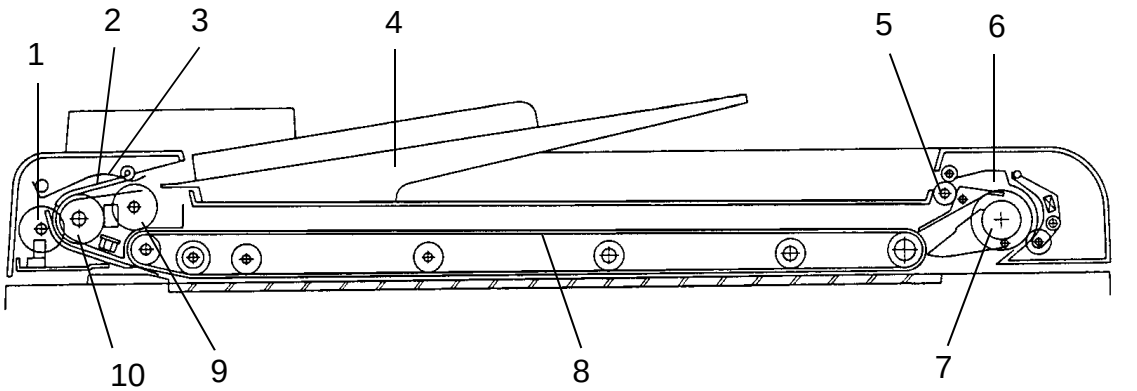
12. DOCUMENT FEEDER (Machine Code: A318)

12.1 SPECIFICATIONS

Original Size and Weight:	— Thin original mode —
	Maximum: A3 / 11" x 17"
	Minimum: B6 / 5 1/2" x 8 1/2"
	Weight: 41 to 128 g/m^2 (11 to 34 lb)
	— Thick original mode —
	Maximum: A3 / 11" x 17"
	Minimum: B6 / 5 1/2" x 8 1/2"
	Weight: 52 to 128 g/m^2 (14 to 34 lb)
	— Auto reverse mode —
	Maximum: A3 / 11" x 17"
	Minimum: B6 lengthwise / 5 1/2" x 8 1/2" lengthwise
	Weight: 64 to 105 g/m^2 (17 to 28 lb)
Original Feed:	Automatic feed — ADF mode Manual feed one by one — SADF mode
Original Table Capacity:	30 sheets / 80 g/m^2 (20 lb)
Original Set:	Face up. First sheet on top
Original Transport:	One flat belt
Copy Speed:	16 copies/minute for A4 / 8 1/2" x 11" sideways (A048 copier) 20 copies/minute for A4 / 8 1/2" x 11" sideways (A054 copier)
Power Consumption:	20 W
Dimensions (W x D x H):	670 x 460 x 103 mm (26.4" x 18.1" x 4.1")
Weight:	Approximately 8.8 kg (19.4 lb)

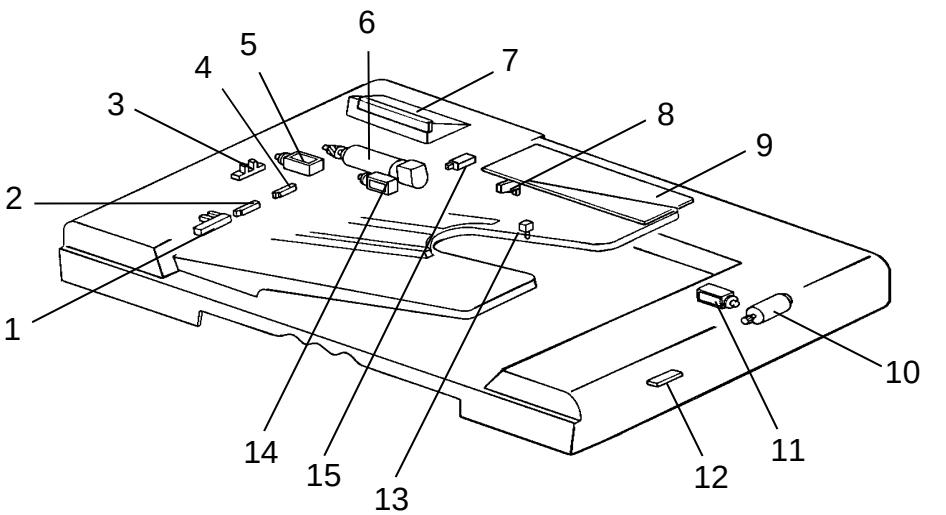
12.2 COMPONENT LAYOUT

- Mechanical Components -



1. Pulse Generator Disk
2. Friction Belt
3. Pick-up Lever
4. Original Table
5. Exit Roller
6. Inverter Pawl
7. Inverter Roller
8. Transport Belt
9. Pick-up Roller
10. Feed Roller

- Electrical Components -

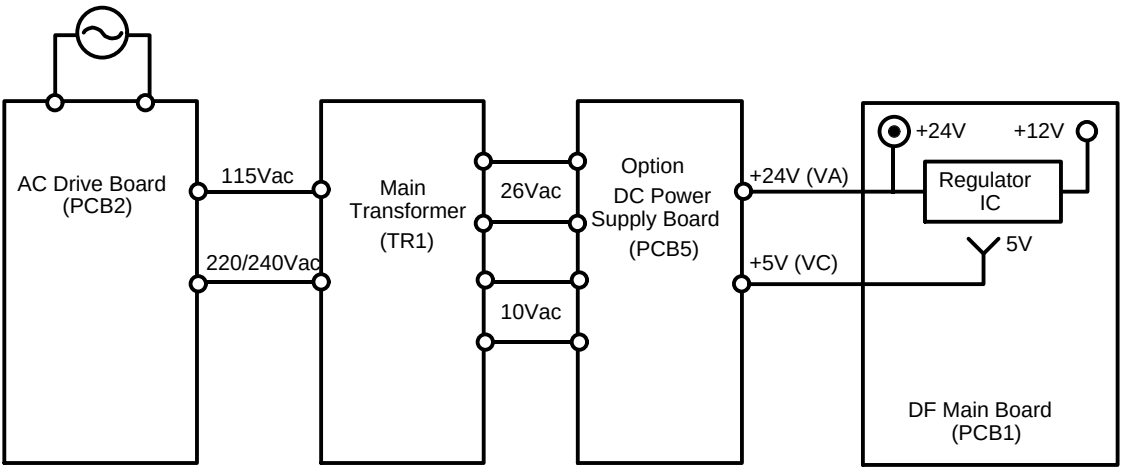


1. Original Set Sensor
2. Registration Sensor
3. Pulse Generator Sensor
4. Original Width Sensor
5. Pick-up Solenoid
6. Belt Drive Motor
7. Indicator Panel
8. Lift Switch
9. DF Main Board
10. Feed-out Motor
11. Inverter Solenoid
12. Feed-out Sensor
13. Original Select Switch
14. Feed-in Solenoid
15. DF Position Sensor

12.3 ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function	Location
Motors			
M1	Belt Drive Motor	DC servomotor that drives to the transport belt and feed-in system (pick-up roller, feed roller, pull-out roller and relay roller).	6
M2	Feed-out Motor	DC servomotor that drives the feed-out unit of the DF.	10
Solenoids			
SOL1	Pick-up Solenoid	Energizes to press the pick-up lever against the stack of originals in preparation for original feed-in.	5
SOL2	Feed-in Solenoid	Turns on to engage the feed-in clutch so rotation is transmitted to the feed roller, pull-out rollers, and relay rollers.	14
SOL3	Inverter Solenoid	Energizes to invert the original when copying two sided originals.	11
Switches			
SW1	Lift Switch	Informs the CPU when the DF is lifted and also serves as the jam reset switch for the DF.	8
SW2	Original Select Switch	Selects thick original mode or thin original mode.	13
Sensors			
S1	Original Set Sensor	Informs copier CPU that originals have been placed and causes the Insert Original indicator to go out.	1
S2	Registration Sensor	Sets original stop timing and measures original length.	2
S3	Original Width Sensor	Determines the width of the originals.	4
S4	Pulse Generator Sensor	Generates pulses used to measure the original length.	3
S5	Feed-out Sensor	Checks for original misfeeds and sets original stop timing when in auto reverse mode.	12
S6	DF Position Sensor	Detects when the document feeder is positioned about 10 cm above exposure glass.	15
Printed Circuit Boards			
PCB1	DF Main Board	Controls all DF functions.	9
PCB2	Indicator Panel Board	Contains operator indicators.	7

12.4 POWER DISTRIBUTION

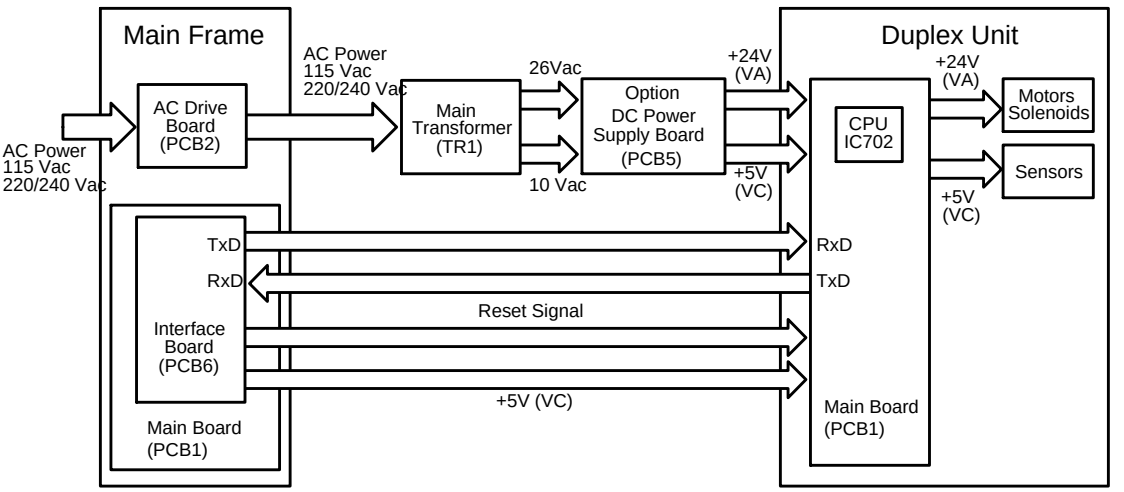


The DF uses three DC power levels: +24 volts, +12 volts, and +5 volts.

When the main switch is turned on, the main transformer receives the wall outlet ac power through the ac drive board and outputs 10 volts ac and 26 volts ac to the option dc power supply board. The option dc power supply board then converts the 10 volts ac input to +5 volts dc and the 26 volts ac input to +24 volts. Then, thoes two dc voltsges are supplied to the DF main board.

The regulator IC on the DF main board further steps down the +24V to +12V.

13. DUPLEX UNIT POWER DISTRIBUTION AND OVERALL MACHINE CONTROL



When the main switch is turned on, the main transformer receives wall outlet ac power through the ac drive board and outputs 10 volts ac and 26 volts ac to the option dc power supply board. The option dc power supply board then converts the 10 volts ac input to +5 volts and the 26 volts ac input to +24 volts. Then, the +5 volts and +24 volts are supplied to the duplex unit main board. The interface board also provides +5 volts to the duplex unit main board and sends a reset signal to initialize the duplex unit CPU.

The duplex unit main board supplies dc power to all electrical components in the duplex unit. All motors and solenoid operate on +24 volts and all sensors operate on +5 volts.

The duplex unit has its own CPU which controls all functions in the duplex unit. The duplex unit CPU communicates with the copier through the interface board using a serial interface.

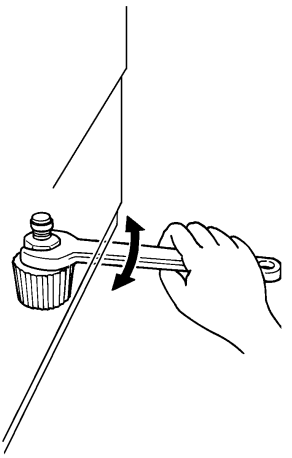
14. INSTALLATION

14.1 INSTALLATION REQUIREMENTS

14.1.1 Environment

1. Temperature Range: 10°C to 30°C (50°F to 86°F)
2. Humidity Range: 15% to 90% RH
3. Ambient Illumination: Less than 1,500 lux. (Do not expose to direct sunlight.)
4. Ventilation: Room of more than 30 m^3. Room air should turn over at least 3 times/hour.
5. Ambient Dust: Less than 0.15 mg/m^3 (4×10^{-3} oz/yd^3)
6. The machine must not be subjected to sudden temperature changes. Do not install the machine where it will be directly exposed to cool air from an air conditioner or hot air from a heater.
7. Avoid placing the machine in an area filled with corrosive gas.
8. Do not install at any location over 2,000 meters (6,500 feet) above sea level.
9. Place the machine on a strong and level base.
10. Avoid any area where the machine may be subjected to frequent, strong vibrations.

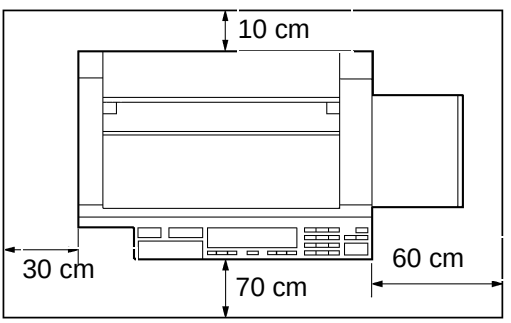
14.1.2 Machine Level

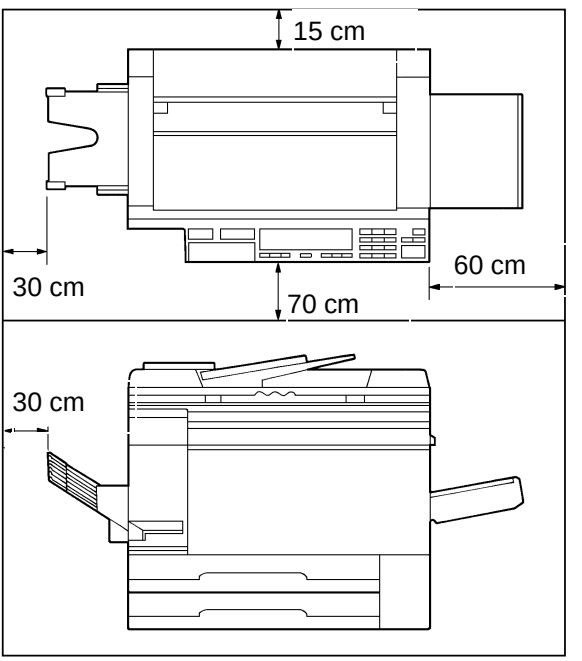


1. Front to back: Within 5 mm (0.2") of level
2. Right to left: Within 5 mm (0.2") of level

Place the machine on a table and screw the leveling feet up or down in order to level the machine. Use a leveling gauge if necessary.

14.1.3 Minimum Space Requirements





1. Front: 70 cm (27.6")
2. Back: 10 cm (3.9")
   : 15 cm (6.0")
   (when the sorter is installed.)
3. Right: 60 cm (31.5")
4. Left: 30 cm (11.8")

NOTE: Make sure there is at least 15 cm (6.0") clearance behind the copier so that the sorter will not be damaged when it is opened.

14.1.4 Power Requirements

1. Input voltage level:

   110V/60Hz : More than 15A (for Taiwan)
   115V/60Hz : More than 15A (for N.A.)
   220V/50Hz : More than 8A (for EU.)
   220V/60Hz : More than 8A (for EU.)
   240V/50Hz : More than 8A (for EU.)

2. Permissible voltage fluctuation: ±10%

3. Do not set anything on the power cord.

NOTE: a) Be sure to ground the machine. (Do not connect the grounding wire to a gas pipe.)

b) Make sure the plug is firmly inserted in the outlet.

c) Avoid multiwiring.

14.2 INSTALLATION PROCEDURE

14.2.1 Introduction:

This section covers only those parts of the copier and option installation procedures that differ from the A048.

The following table shows which options can be used on the A048 and A054 copiers:

	A048 Copier	A054 Copier
Document Feeder	(A465)	(A318)
	(A318)	**NOTE (1)**
Sorter	(A490)	(A490)
Duplex Unit	(A491)	(A491) **NOTE (2)**
Color Development Unit	(A313)	(A313)
DC Power Supply Unit	(A494)	**NOTE (3)**

( ) : Product Code

NOTE: (1) The A465 DF can be installed on the A054 copier; however, the A465 DF does not have a DF positioning sensor, so APS mode will not function in platen mode.

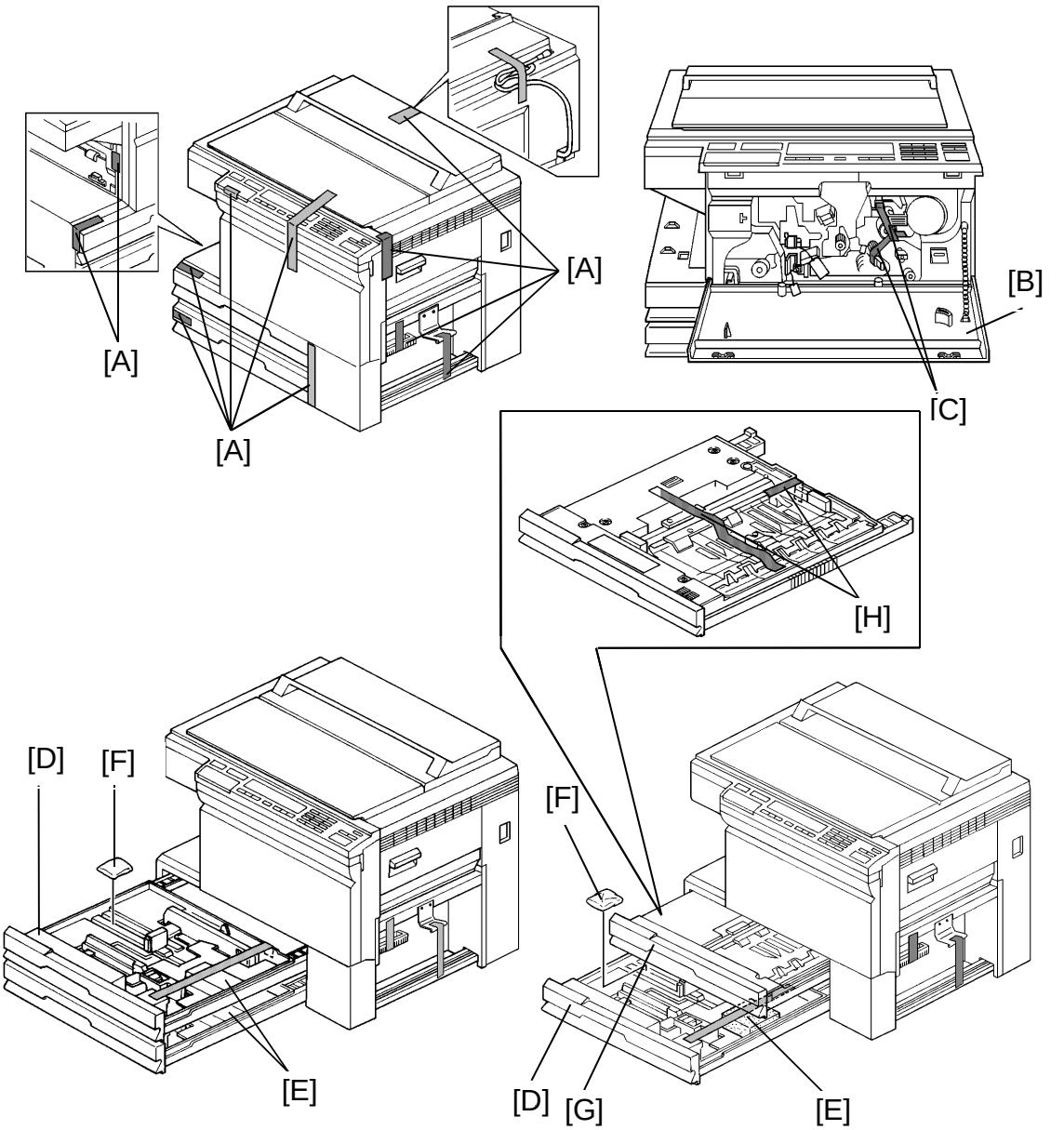
(2) A054 copiers with the destination codes A054-26, -27 -46, and -47 are equipped with a duplex unit as a standard feature.

(3) The dc power supply unit for the document feeder and duplex unit and the interface board are already installed on the A054 copier at the factory. The optional dc power supply unit (Unit code #A494) is not required.

(4) The installation procedures of the following options are the same as those of the A048 copier. Refer to each section of the A048 copier as follows:

1. Key Counter Holder — Refer to page 3-12.
2. Optics Anti-condensation Heater — Refer to page 3-13.
3. Color Development Unit — Refer to page 3-14 to16.

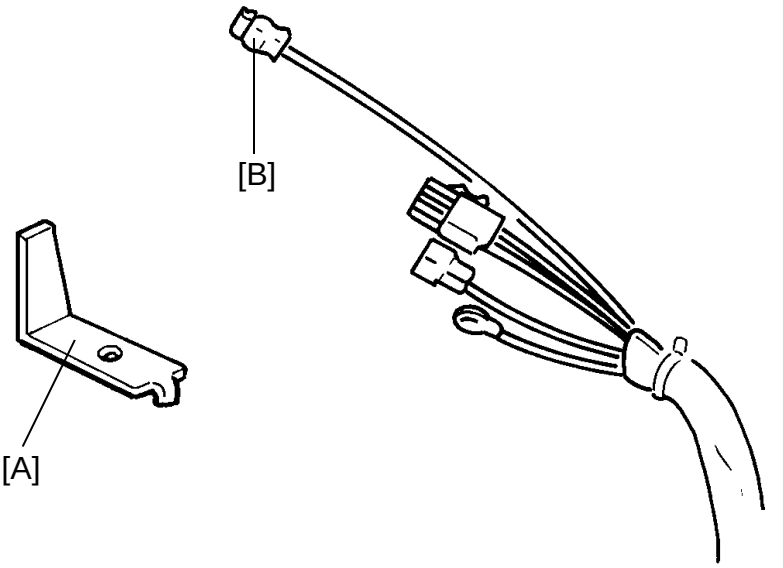
14.2.2 Copier Installation



1. Remove 11 strips of tape [A] from the copier.
2. Open the front cover [B], and remove 2 strips of tape [C].
3. Pull out the paper tray [D] and remove the foam blocks [E] (strips of tape) and the silica gel [F]. On machines equipped with the duplex unit [G], pull out the duplex unit and remove the 2 strips of tape [H].
4. Do **steps 5 to 21** of the A048 copier installation procedure (page 3-5 to 9).
   - See page 3-10 for the 220/240 conversion procedure.
   - See page 3-11 for the cassette modification procedure.

14.3 DOCUMENT FEEDER INSTALLATION

14.3.1 Accessory Check



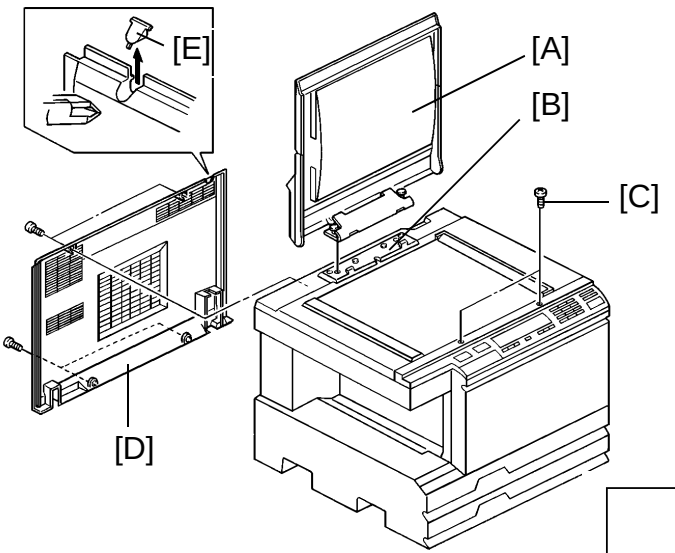
A DF position sensor actuator and a screw have been added as accessories for the APS function in platen mode, Also, a dc harness (connector [B]) for the APS function has been added to the DF harness assembly.
(When the A318 DF is installed on the A048 copier, the above accessories are not necessary and the connector [B] is not used.)

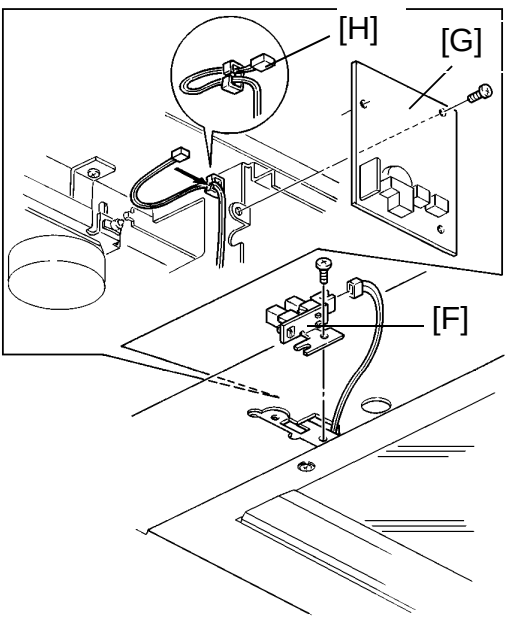
Check the quantity and condition of the accessories in the box according to the following list:

1. DF Position Sensor Actuator [A] . . . . . 1 pc
2. Philips Pan Head Screw With Washer - M3 x 5 . . . . . 1 pc

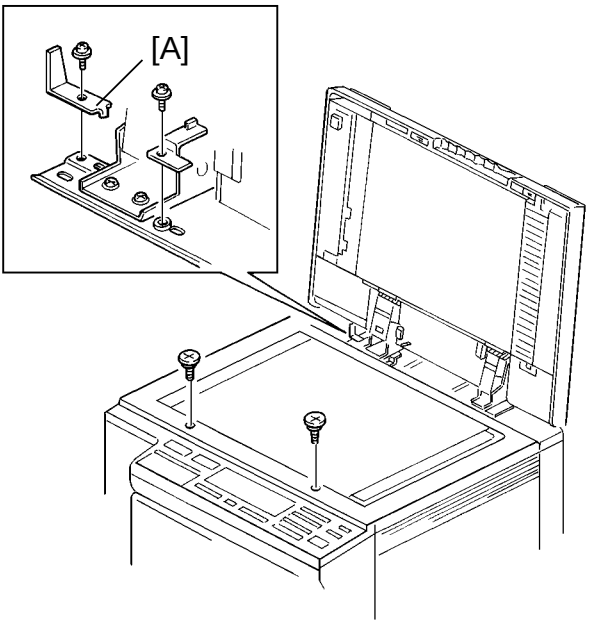
NOTE: For the other accessories, refer to the list on page 8-24.

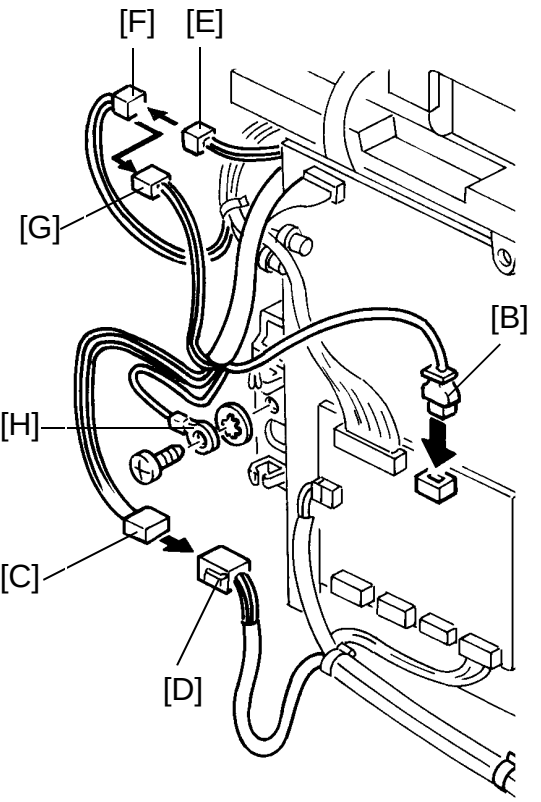
14.3.2 Installation Procedure





1. Remove the following parts from the copıer:
   1) Platen Cover [A] (2 push-locks)
   2) Platen Cover Pedestal [B] (4 screws)
   3) The 2 screws [C] securing the operation panel
   4) Rear Cover [D] (7 screws).
2. Remove the harness caps [E] on the rear cover with a pair of nippers.
3. Remove the platen cover position sensor [F] (1 screw).
4. Remove the CC/G/B power pack [G] (1 screw and 2 locking supports) and clamp the connector [H] as shown in the illustration; then, reinstall the CC/G/B power pack.





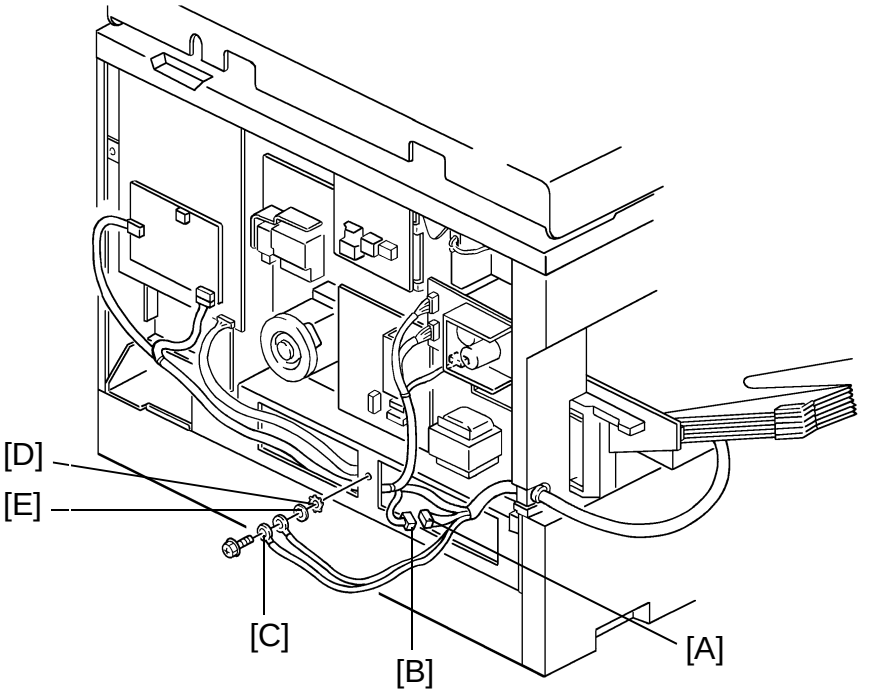
5. Do **steps 4 to 10** of the installation procedure for the A048 copier (page 8-26 to 27).
6. Install the DF position sensor actuator [A] (1 screw).
7. Do **steps 11 and 12** of the installation procedure for the A048 copier (page 8-27).
8. Connect the optics cable connector (2P/Black) [B] to CN206 on the interface board.
9. Connect the DC harness (4P/White) [C] to the harness connector [D].
10. Disconnect the platen cover position sensor connectors [E] [F], then connect connector [F] to the DF position sensor connector [G].

NOTE: If this procedure is not done, the APS mode will not function in platen mode.

11. Secure the grounding wire [H] to the right side plate.

12 Do **steps 16 to 25** of the installation procedure for the A048 copier (page 8-28 to 30).

14.4 SORTER INSTALLATION



NOTE: Refer to the list on page 9-12 to check the accessories.

1. Do **steps 1 to 11** of the installation procedure for the A048 copier (page 9-13 to 14).
2. Connect the sorter dc harness [A] (10P/Brown) to the harness connector [B].
3, Secure the grounding wire [C] (1 screw, toothed washer [D], and spring washer [E]) to the rear frame as shown.
4. Do **steps 15 to 19** of the installation procedure for the A048 copier (page 9-15).

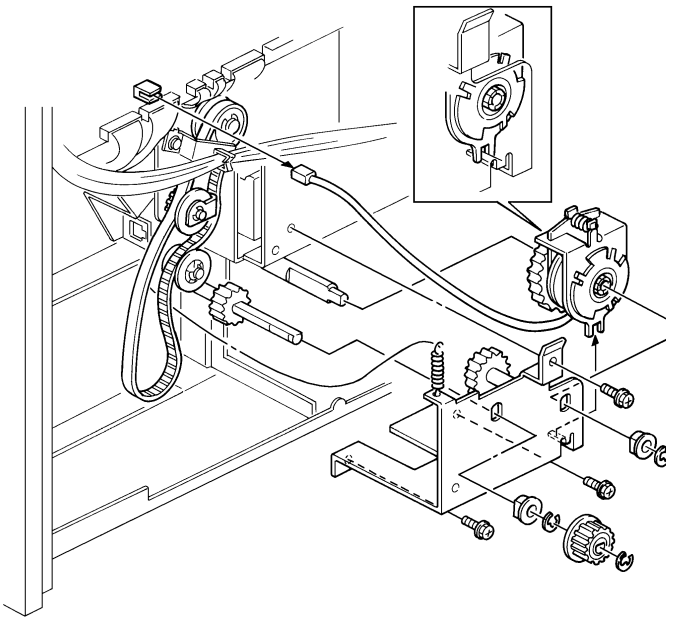
14.5 DUPLEX UNIT INSTALLATION

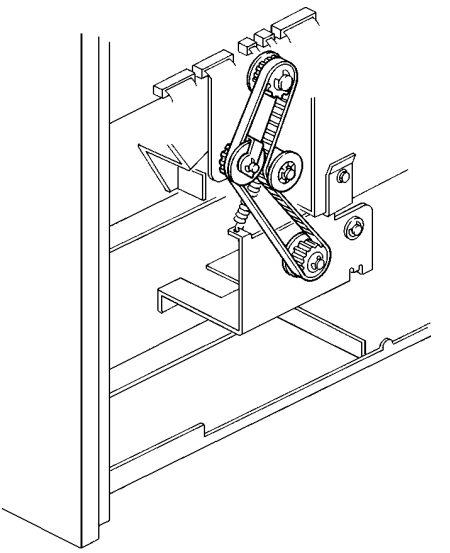
NOTE: Refer to the list on page 10-13 to check the accessories.

1. Follow the A048 duplex unit installation procedure (pages 10-13 to 10-18).

NOTE: **Steps 2, 13, 19, and 20** in the duplex unit installation procedure are not necessary with the A054 copier.

15. 3RD PAPER FEED CLUTCH SOLENOID REPLACEMENT



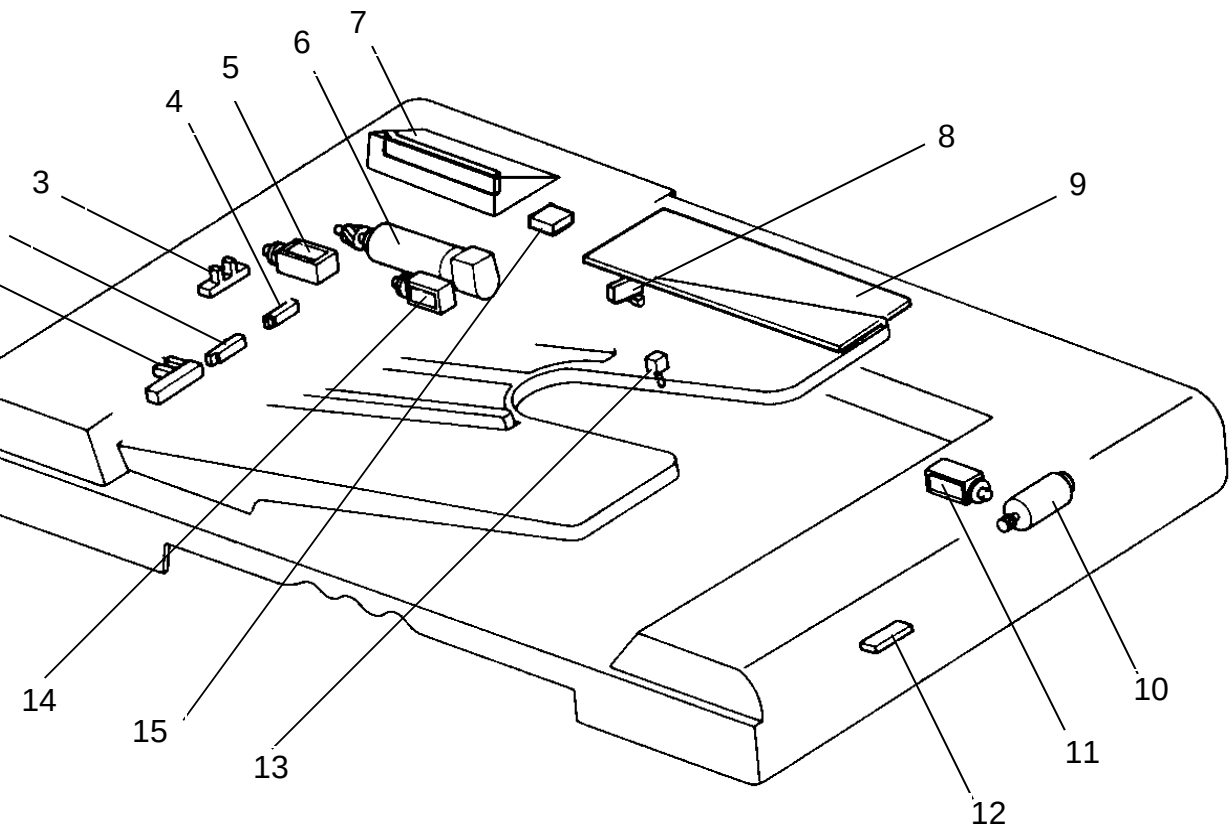


1. Turn off the main switch.
2. Remove the rear cover (7 screws).
3. Unhook the spring [A] from the tension pulley bracket [B].
4. Remove the drive belt [C] from the drive pulley [D]; then remove the pulley (1 E-ring).
5. Re move the 3rd paper feed clutch solenoid bracket [E] (2 E-rings and bushings and 3 screws).
6. Replace the 3rd paper feed clutch solenoid [F] (1 connector).

NOTE: 1. When the clutch solenoid is installed, make sure that the stopper [G] on the bracket fits into the slot on the clutch solenoid as shown.

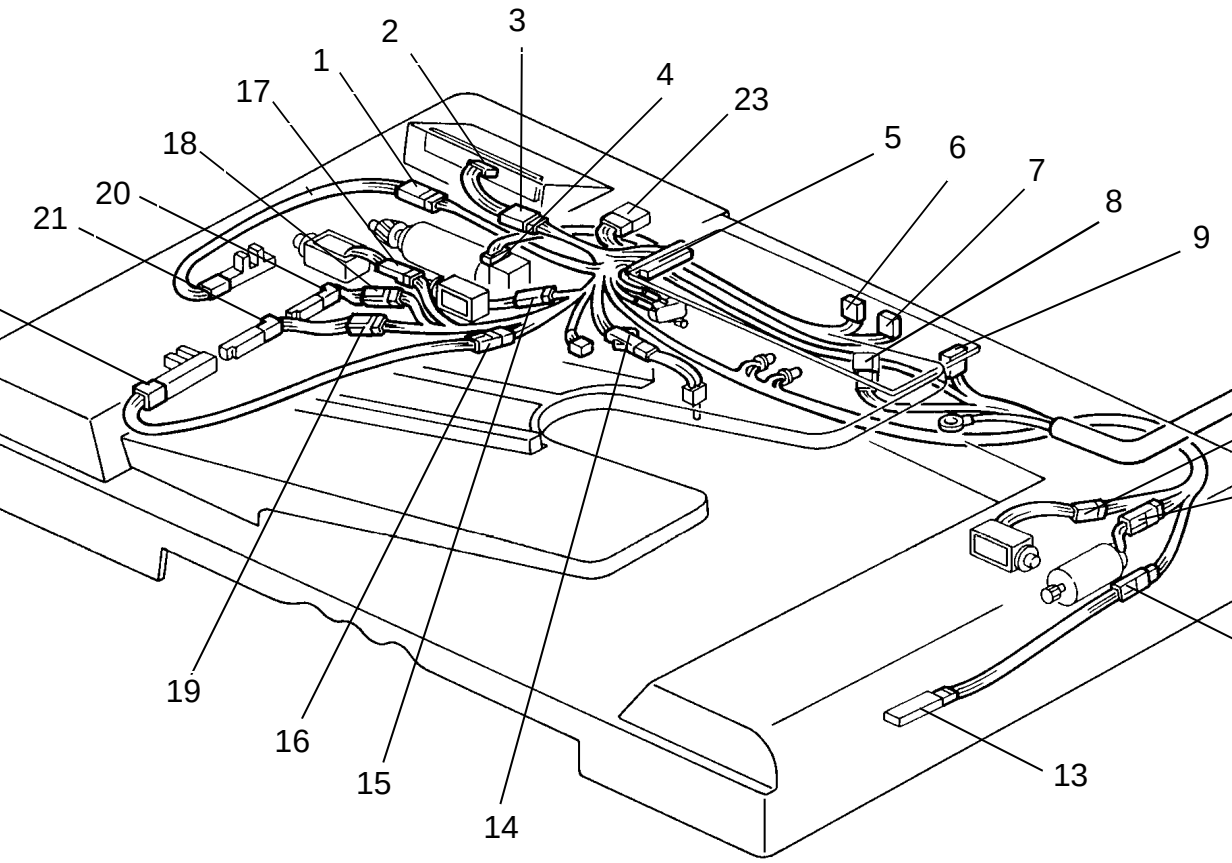
2. When the drive belt is installed, make sure that the belt stoppers [H] of the drive pulleys are positioned correctly as shown. This is to prevent the drive belt from coming off the pulleys.

UMENT FEEDER ELECTRICAL COMPONENTS AND CONNECTORS LAY



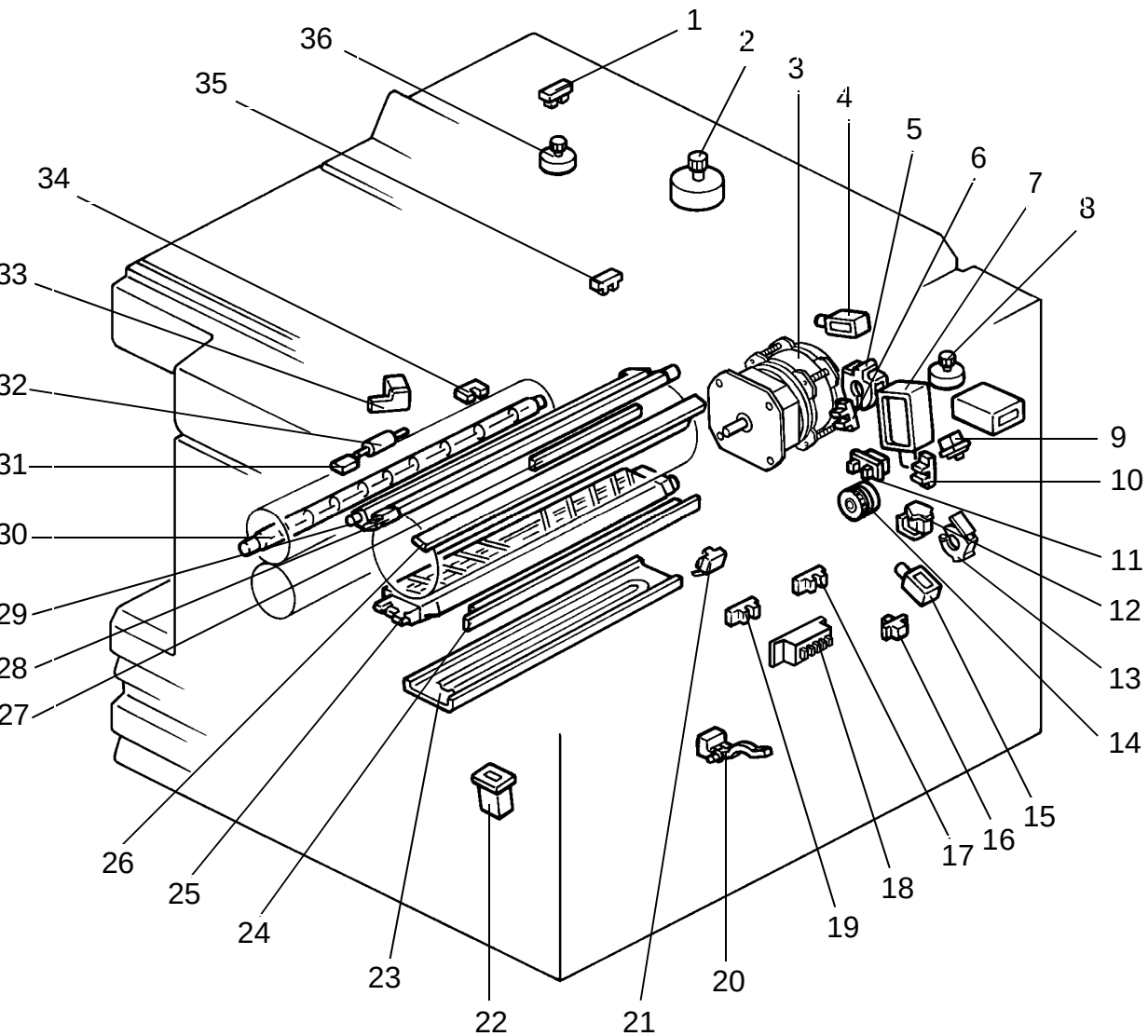
ment Feeder Electrical Components

Description	Symbol	P to P
Original Set Sensor	S1	B15
Registration Sensor	S2	B16
Pulse Generator Sensor	S4	B16
Original Width Sensor	S3	B17
Pick-up Solenoid	SOL1	B19
Belt Drive Motor	M1	B14
Indicator Panel	PCB2	B18
Lift Switch	SW1	B19
DF Main Board	PCB1	C14 – C20
Feed-out Motor	M2	B15
Inverter Solenoid	SOL3	B20
Feed-out Sensor	S5	B17
Original Select Switch	SW2	B18
Feed-in Solenoid	SOL2	B20
DF Position Sensor	S6	F20



nent Feeder Connectors

CN No.	Component	Symbol	Type	P
CN118	—	—	3P/R	
CN200	Indicator Panel	PCB2	4P/W	C
CN119	—	—	6P/W	
CN111	Belt Drive Motor	M1	6P/W	C
CN104	DF Main Board	PCB1	34P/B	
CN103	DF Main Board	PCB1	4P/W	C
CN102	DF Main Board	PCB1	2P/W	
CN106	DF Main Board	PCB1	2P/B	C
CN101	DF Main Board	PCB1	5P/W	
CN110	Inverter Solenoid	SOL3	2P/R	C
CN108	Feed-out Motor	M2	4P/W	
CN109	—	—	3P/W	
CN119	Feed-out Sensor	S5	3P/W	
CN120	Original Select Switch	SW2	2P/W	
CN115	Feed-in Solenoid	SOL2	2P/Y	
CN116	—	—	3P/W	
CN114	Pick-up Solenoid	SOL1	2P/R	
CN121	—	—	3P/W	
CN117	—	—	3P/Y	
CN31	Original Width Sensor	S3	3P/B	
CN27	Regiastration Sensor	S2	3P/B	
CN26	Original Set Sensor	S1	3P/W	
CN006	DF Position Sensor	S6	3P/W	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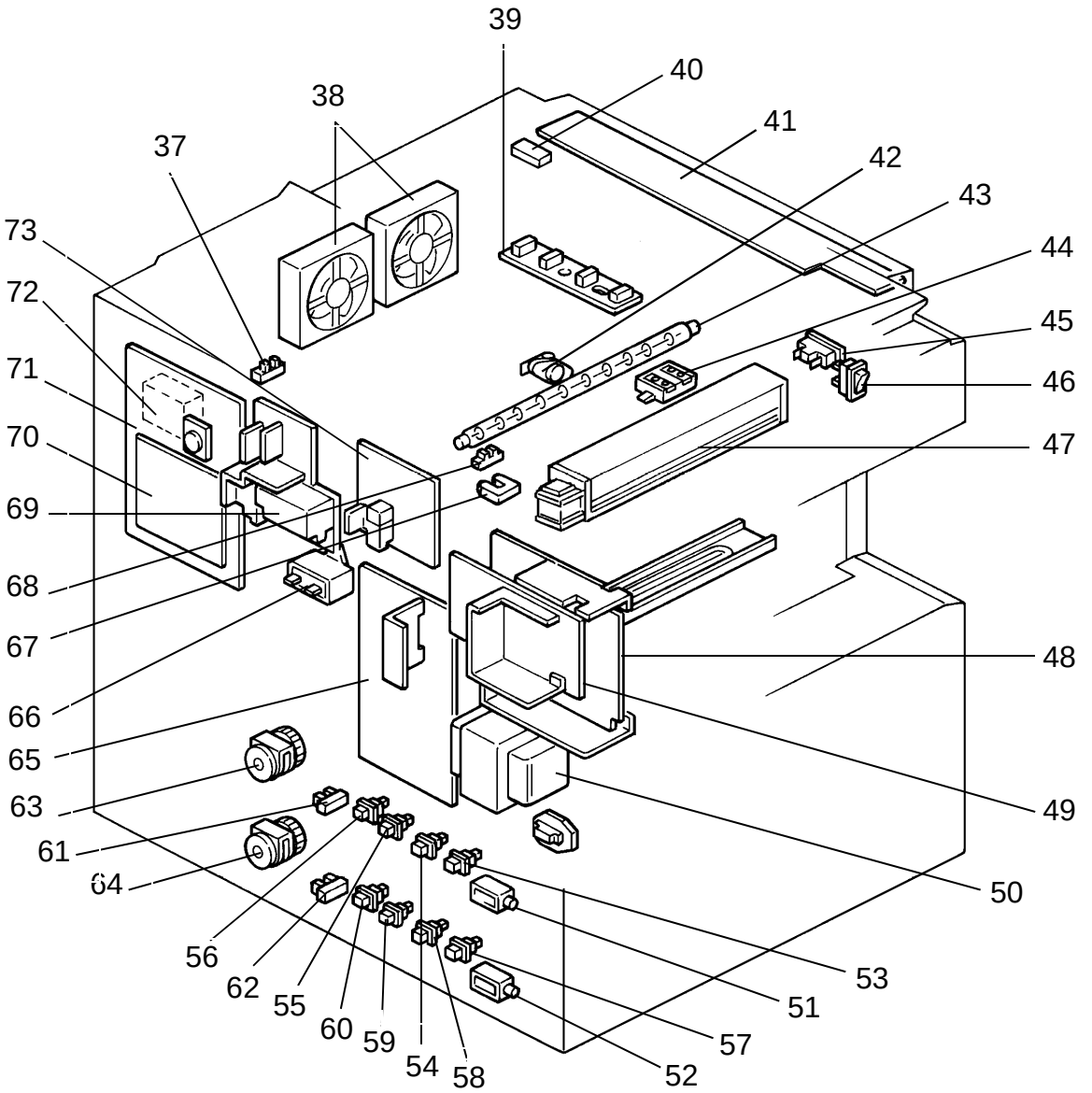
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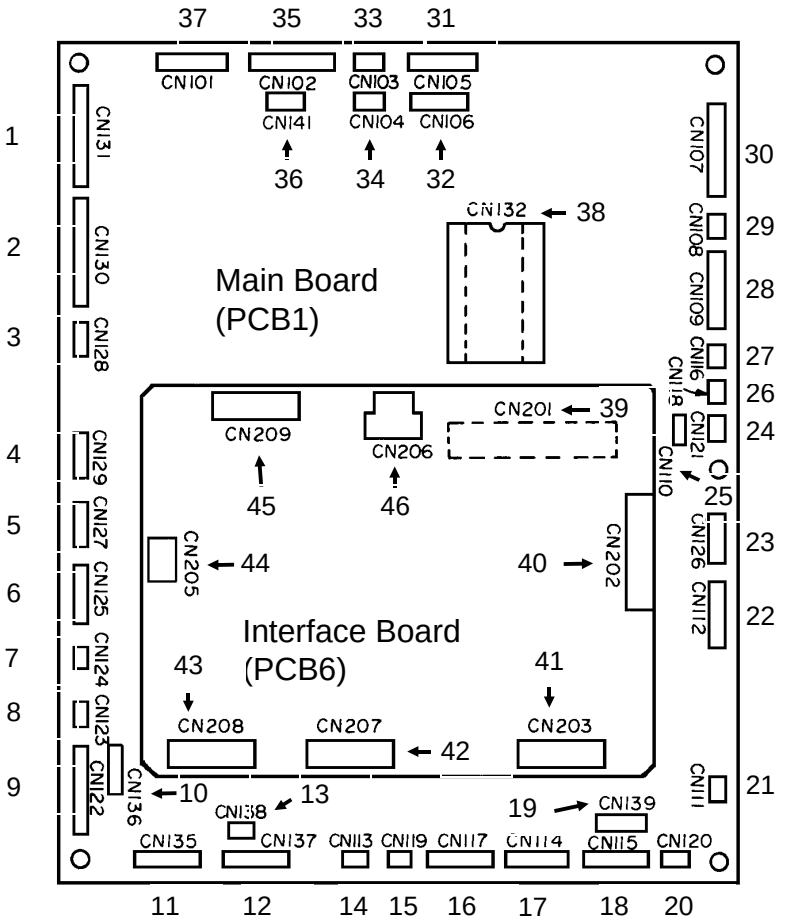
r Electrical Components

Description	Symbol	P to P
Scanner H.P. Sensor	S1	O9
Scanner Motor	M2	O11
Main Motor	M1	A7
Development CL Sol.	SOL7	O17
Toner Supply CL Sol.	SOL1	O18
Toner End Sensor	S8	O7
Pick-up Roller Release Sol.	SOL4	O15
4th/5th Mirror Motor	M4	O12
Manual Feed Table SW	SW9	O4
Development Unit Set Sensor	S12	O8
Color Switch	SW8	O8
1st Paper Feed CL Sol.	SOL2	O14
Paper Lift CL Sol.	SOL5	O15
Registration Clutch	MC1	O17
Relay Roller CL Sol.	SOL8	O16
Right Cover SW	SW10	O1
1st Paper End Sensor	S6	O3
1st Paper Size SW	SW3	O2
Paper Lift Sensor	S10	O5
Relay Sensor	S14	O22
Registration Sensor	S4	O5
Total Counter	CO1	O18
Drum Anti-condensation Heater	H1	F4
Pre-transfer Lamp (PTL)	L5	G5
Transfer and Separation Corona Unit	—	G7
Erase Lamp (EL)	L4	H8
ID Sensor	S11	H4
Charge Corona Unit	—	G6
Quenching Lamp (QL)	L3	A8
Fusing Lamp	L2	A7
Fusing Thermister	TH1	G5
Fusing Thermofuse	TF	B7
Auto ID Sensor	PCB4	O9
Toner Overflow Sensor	S9	O7
Exit Sensor	S5	O7
Lens Motor	M3	O12
4th/5th Mirror H.P. Sensor	S3	O10
Optics Cooling Fan Motors	M5	O13
Original Length Sensor	S17	F21
Platen Cover Closed SW	SW15	H20

Description	Symbol	P to P
Operation Panel Board	PCB7	G1 – G4
Optics Thermoswitch	TS	A9
Exposure Lamp	L1	A10
Original Width Sensor	S16	H21
Cover Safety SW	SW2	B3, B4
Main SW	SW1	C3
Exhaust Blower Motor	M7	A6
Main DC Power Supply Board	PCB3	F8
Option DC Power Supply Board	PCB5	E8
Main Transformer	TR1	E5
Upper Tray Lock Sol.	SOL6	O16
Lower Tray Lock Sol.	SOL10	O23
2nd Paper Size SW-4	SW7	O3
2nd Paper Size SW-3	SW6	O3
2nd Paper Size SW-2	SW5	O3
2nd Paper Size SW-1	SW4	O2
3rd Paper Size SW-4	SW14	O21
3rd Paper Size SW-3	SW13	O20
3rd Paper Size SW-2	SW12	O20
3rd Pape Size SW-1	SW11	O20
2nd Paper End Sensor	S7	O4
3rd Paper End Sensor	S13	O21
2nd Paper Feed CL Sol.	SOL3	O14
3rd Paper Feed CL Sol.	SOL9	O22
Main Motor Capacitor	C	—
AC Drive Board	PCB2	C10
Platen Cover Position Sensor	S15/S6	E20
Lens H.P. Sensor	S2	O10
TC/SC Power Pack	P2	H7
Interface Board	PCB6	J16
Main Board	PCB1	K1
Key Counter (Option)	CO2	O18
CC/Grid/Bias POwer Pack	P1	H6


Main Board
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Interface Board
(PCB6)
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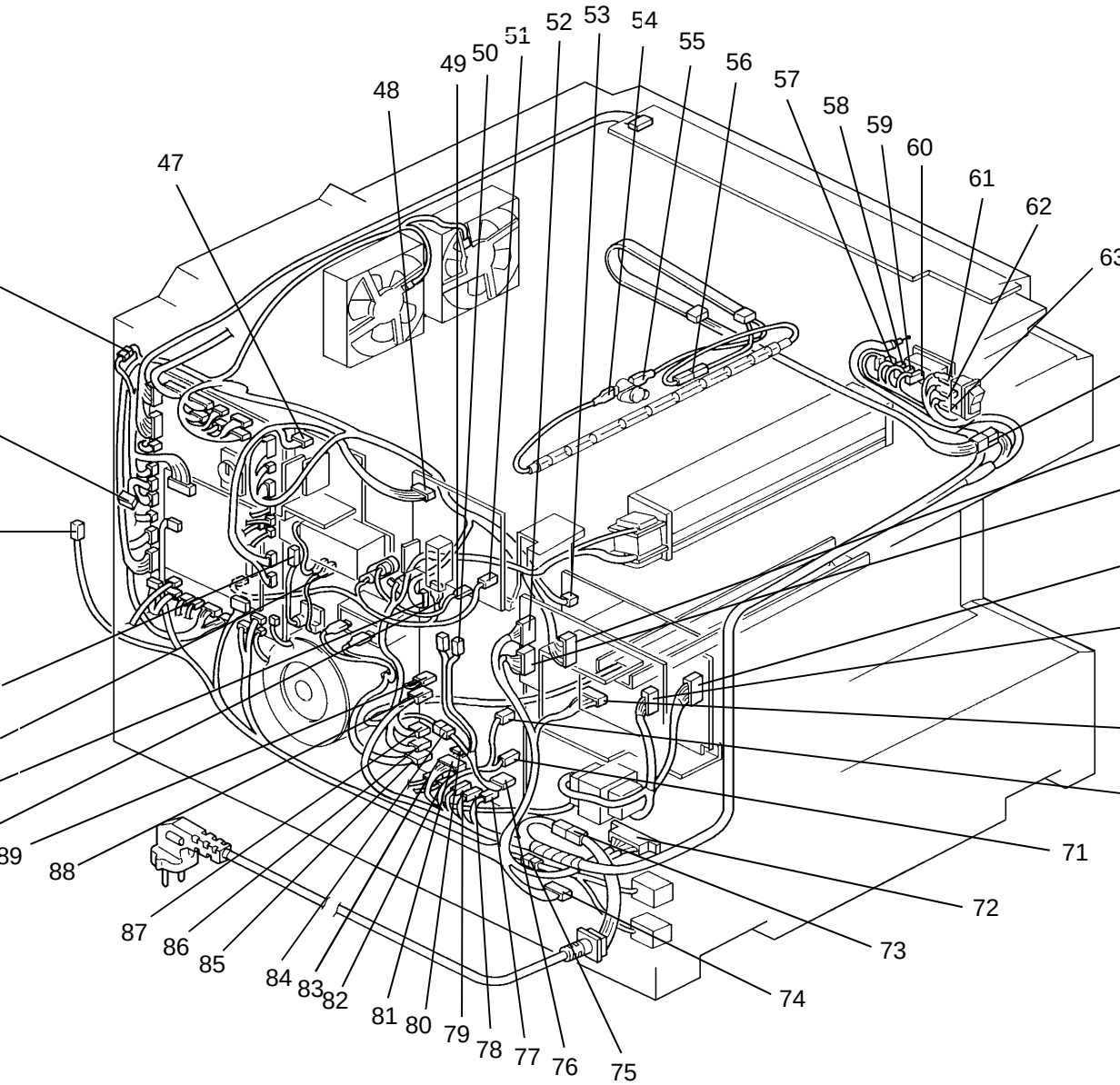
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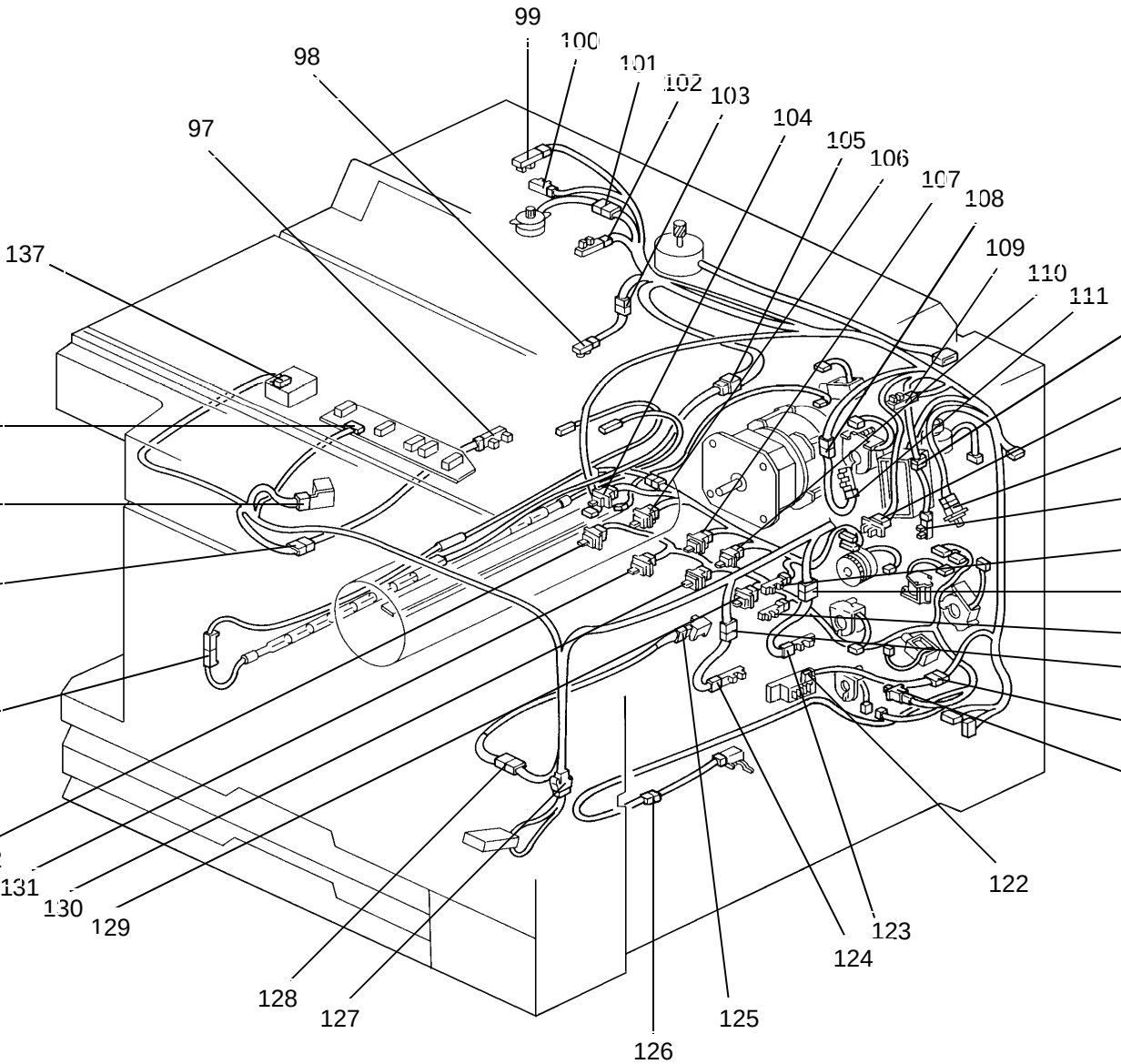
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r Connectors

CN No.	Component	Symbol	Type	
CN131	Main Board (Operation Panel Board)	PCB1	15P/W	J
CN130	Main Board (Operation Panel Board)	PCB1	13P/W	J
CN128	Main Board (Pick-up Roller Release Solenoid)	PCB1	2P/W	
CN129	Main Board (Total Counter)	PCB1	4P/B	
CN127	Main Board (Key Counter)	PCB1	4P/T	
CN125	Main Board (Paper Lift and 1st Paper End Sensors)	PCB1	6P/W	M
CN124	Main Board (Paper Lift Clutch Solenoid)	PCB1	2P/Y	
CN123	Main Board (Development Unit Set Sensor)	PCB1	4P/W	
CN122	Main Board (Fusing Thermistor and Scanner HP Sensor)	PCB1	14P/W	J
CN136	Main Board (Open)	PCB1	5P/T	
CN135	Main Board (3rd Paper Size Switches)	PCB1	9P/C	M
CN137	Main Board (Right Cover SW, 3rd Paper End Sensor, Relay Sensor)	PCB1	11P/C	M1
CN138	Main Board (3rd Paper Feed CL Sol.)	PCB1	2P/C	
CN113	Main Board (Relay Roller Clutch Solenoid)	PCB1	2P/W	
CN119	Main Board (1st Paper Feed Clutch Solenoid)	PCB1	2P/B	
CN117	Main Board (Right Cover and 1st Paper Size Switches)	PCB1	8P/W	M
CN114	Main Board (Toner End Sensor, Color and Manual Feed Table SW)	PCB1	8P/C	M7
CN115	Main Board (2nd Paper Size Switches)	PCB1	9P/W	M
CN139	Main Board (Upper Tray Lock Sol and 2nd Paper End Sensor)	PCB1	5P/W	M
CN120	Main Board (2nd Paper Feed Clutch)	PCB1	2P/W	M
CN111	Main Board (Registration Clutch)	PCB1	2P/B	
CN112	Main Board (CC/Grid/Bias Power Pack)	PCB1	8P/W	
CN126	Main Board (TC/SC Power Pack)	PCB1	5P/W	
CN121	Main Board (Pre-transfer Lamp)	PCB1	2P/C	
CN110	Main Board (Image Density Sensor)	PCB1	3P/W	
CN118	Main Board (Toner Supply Clutch Solenoid)	PCB1	2P/Y	
CN116	Main Board (Development Clutcfh Solenoid)	PCB1	2P/W	
CN109	Main Board (Erase Lamp)	PCB1	9P/W	
CN108	Main Board (Main DC Power Supply Board)	PCB1	2P/B	J1
CN107	Main Board (Main DC Power Supply Board)	PCB1	6P/W	J1
CN105	Main Board (Scanner Motor)	PCB1	6P/T	
CN106	Main Board (4th/5th Mirror Motor)	PCB1	6P/W	
CN103	Main Board (Optics Cooling Fan Motor –1)	PCB1	2P/W	
CN104	Main Board (Optics Cooling Fan Motor –2)	PCB1	2P/W	
CN102	Main Board (Lens Motor)	PCB1	12P/W	
CN141	Main Board (Exit Sensor)	PCB1	3P/W	
CN101	Main Board (Toner Overflow Sensor)	PCB1	10P/W	
CN132	Main Board/RAM Board	PCB1	24P/B	
CN133	Main Board	PCB1	30P/B	
CN202	Interface Board (Open)	PCB6	20P/B	
CN203	Interface Board (Sorter)	PCB6	10P/C	J1
CN207	Interface Board (Open)	PCB6	12P/R	
CN208	Interface Board (Open)	PCB6	12P/B	
CN205	Interface Board (Duplex)	PCB6	4P/C	J1
CN209	Interface Board (Original Length/Width Sensors, Platen Cover Closed SW, Platen Cover/DF Position Sensor)	PCB6	12P/B	J2
CN206	Interface Board (DF)	PCB6	2P/B	
CN1	TC/SC Power Pack	P2	5P/W	
CN1	CC/G/B Power Pack	P1	8P/W	
TG		P1	1P/–	

CN No.	Component	Symbol	Type	P
TB	CC/G/B Power Pack	P1	1P/–	
CN102	Option DC Power Supply Board	PCB5	4P/W	
CN102	Main DC Power Supply Board	PCB3	2P/W	
T	Optics Thermoswitch	TS	1P/–	
T	Optics Thermoswitch	TS	1P/–	
CN4	Exposure Lamp	L1	1P/W	
T7	Cover Safety Switch	SW2	1P/–	
T6	Cover Safety Switch	SW2	1P/–	
T5	Cover Safety Switch	SW2	1P/–	
T4	Cover Safety Switch	SW2	1P/–	
T3	Main Switch	SW1	1P/–	
T1	Main Switch	SW1	1P/–	
T2	Main Switch	SW1	1P/–	
CN3	Flat Cable for Exposure Lamp	—	2P/W	B9
CN101	Main DC Power Supply Board	PCB3	6P/W	F8
CN101	Option DC Power Supply Board	PCB5	4P/W	E8
CN100	Main DC Power Supply Board	PCB3	6P/W	
CN100	Option DC Power Supply Board	PCB5	4P/W	
CN103	Main DC Power Supply Board	PCB3	3P/W	
T403	AC Drive Board	PCB2	1P/R	
T404	AC Drive Board	PCB2	1P/R	
CN710	Duplex Unit	—	8P/B	E15
CN1	Power Supply Cord	—	2P/W	
CN2	Sorter	—	10P/T	E12
CN828	Upper Tray Lock Solenoid (Relay Connector)	SOL6	2P/W	
CN411	AC Drive Board	PCB2	2P/P	
T401	AC Drive Board	PCB2	1P/W	
T407	AC Drive Board	PCB2	1P/W	
T402	AC Drive Board	PCB2	1P/B	
CN418	AC Drive Board (Open)	PCB2	3P/B	
CN417	AC Drive Board	PCB2	3P/W	
T405	AC Drive Board	PCB2	1P/Y	
T406	AC Drive Board	PCB2	1P/Y	
CN2	Drum Anti-condensation Heater	H1	2P/R	
CN415	AC Drive Board	PCB2	2P/B	
CN413	AC Drive Board	PCB2	2P/B	
CN420	AC Drive Board	PCB2	3P/W	
CN419	AC Drive Board	PCB2	2P/Y	
CN421	AC Drive Board (220/240V only)	PCB2	2P/W	
TC	CC/G/B Power Pack	P1	1P/–	
CN401	AC Drive Board	PCB2	9P/W	E9
TS	TC/SC Power Pack	P2	1P/–	
TT	TC/SC Power Pack	P2	1P/–	
CN1	Document Feeder	—	4P/W	
CN804	Key Counter (Relay Connector)	CO2	4P/W	
CN901	Relay Connector for Platen Cover/DF Position Sensor	—	3P/B	
CN836	Toner Overflow Sensor	S9	3P/W	
CN844	Exit Sensor	S5	3P/W	
CN806	Scanner HP Sensor	S1	3P/W	
CN906	Platen Cover/DF Position Sensor	S6	3P/W	

CN No.	Component	Symbol	Type	P
CN825	Lens Motor (Relay Connector)	M3	6P/W	N
CN824	Lens HP Sensor	S2	3P/W	
CN839	Relay Connector for Exit Sensor	—	3P/W	
CN809	2nd Paper Size Switch-1	SW4	2P/B	
CN808	Relay Connector for Fusing Thermistor	—	2P/W	
CN810	2nd Paper Size Switch-2	SW5	2P/B	
CN811	2nd Paper Size Switch-3	SW6	2P/B	
CN822	Relay Connector for Toner End Sensor	—	3P/W	
CN826	4th/5th Mirror HP Sensor	S3	3P/W	
CN812	2nd Paper Size Switch-4	SW7	2P/B	
CN840	Toner End Sensor	S8	3P/W	
CN823	Relay Connector for Development Unit Set Sensor	—	3P/S	
CN821	Color Switch	SW8	3P/W	
CN818	Manual Feed Table Switch	SW9	2P/W	
CN842	Development Unit Set Sensor	S12	3P/S	
CN815	2nd Paper End Sensor	S7	3P/W	
CN801	3rd Paper End Sensor	S13	3P/W	
CN305	Relay Connector for 1st Paper End Sensor	—	3P/W	
CN803	Relay Connector for Paper LIft Sensor	—	3P/W	
CN817	Relay Connector for 1st Paper Size Switch	—	6P/W	
CN307	Right Cover Switch	SW10	2P/W	
CN843	1st Paper Size Switch	SW3	6P/W	
CN845	1st Paper End Sensor	S6	3P/W	
CN846	Paper Lift Sensor	S10	3P/W	
CN832	Registration Sensor	S4	3P/W	
CN306	Relay Connector for Relay Sensor	—	3P/W	
CN802	Total Counter (Relay Connector)	CO1	3P/B	
CN816	Relay Connector for Registration Sensor	—	3P/W	
CN303	3rd Paper Size Switch-4	SW14	2P/B	
CN302	3rd Paper Size Switch-3	SW13	2P/Y	
CN301	3rd Paper Size Switch-2	SW12	2P/S	
CN300	3rd Paper Size Switch-1	SW11	2P/W	
CN5	Fusing Lamp	L2	1P/W	
CN827	Relay Connector for Toner Overflow Sensor	—	3P/W	
CN301	Auto Image Density Sensor	PCB4	4P/W	
CN902	Original Length Sensor	S17	7P/W	
CN903	Original Width Sensor	S16	4P/W	H2

CS110 (A490)

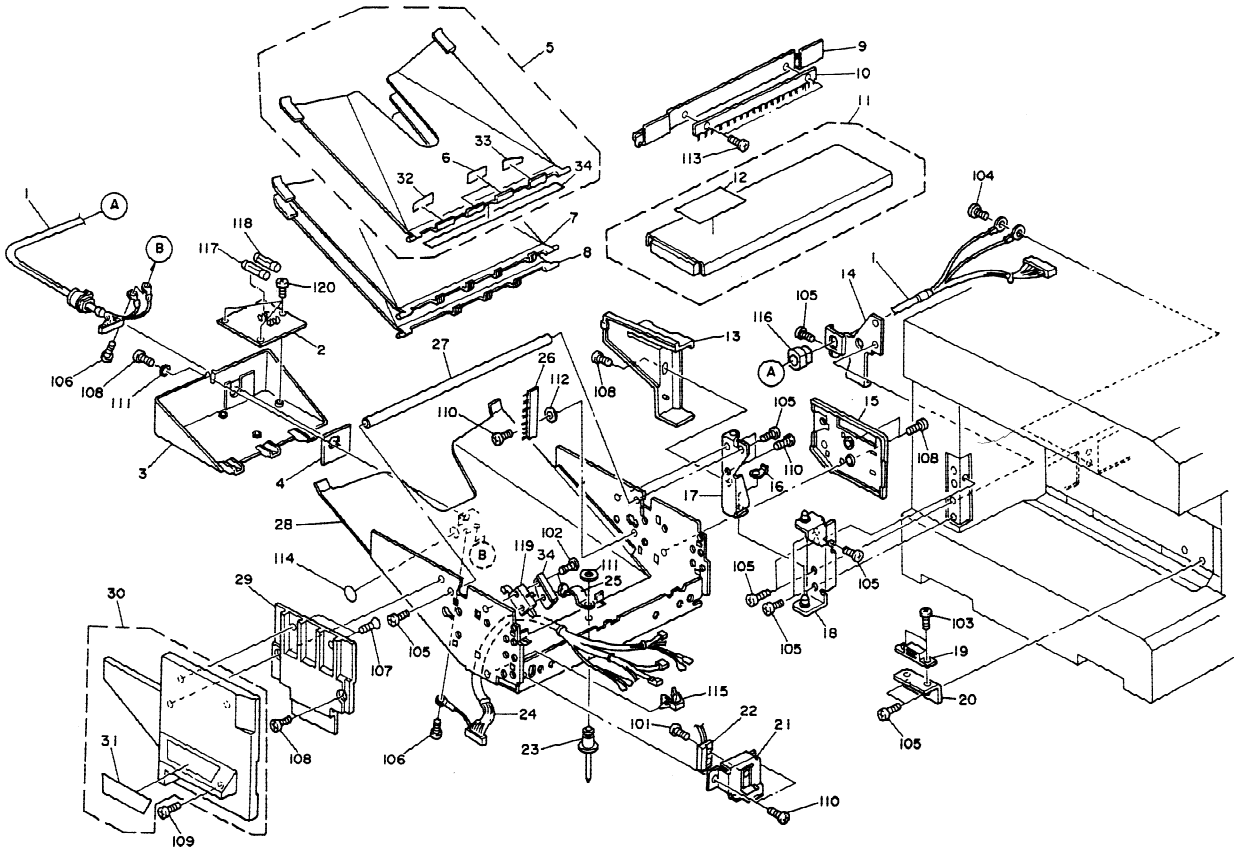
PARTS CATALOG

INTRODUCTION

This chapter instructs you the numbers and names of these parts on this machine.

INDEX to PARTS CATALOG

1. EXTERIOR (A490) 2
2. TRANSPORT (A490) 4
3. SORTER MAIN BOARD (A490) 6
4. SORTER MAIN HARNESS (A490) 8
5. DECAL AND DOCUMENT (A490) 10
Parts Index 12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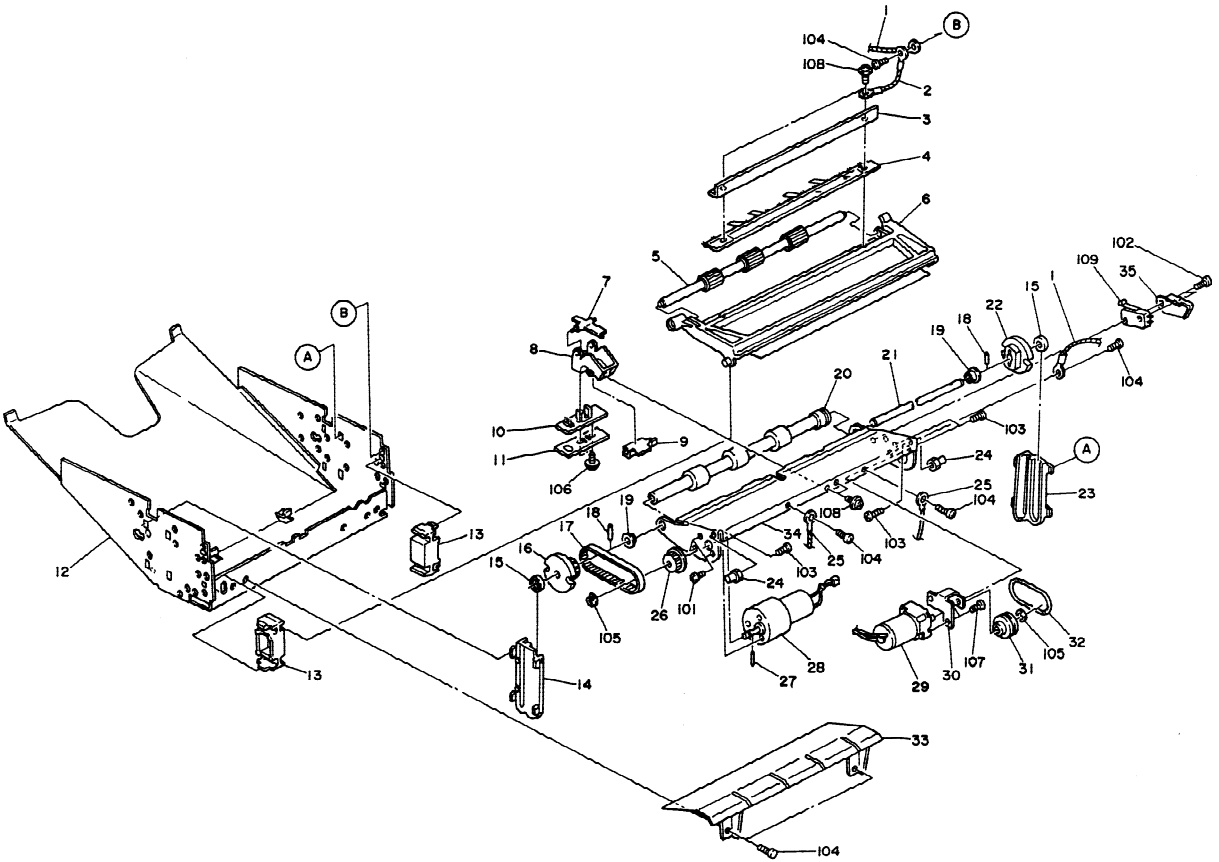
1. EXTERIOR (A490)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
1	A490 5610	Interface Harness	1
2	6801 5510	Sorter Main Board	1
3	A467 6161	Lower Cover	1
4	6802 5961	Strain Relief Plate	1
5	A490 3005	Sorter Bin - Top	1
6	6801 3145	Paper Stopper	2
7	A414 3151	Sorter Bin - Even	4
8	A414 3111	Sorter Bin - Odd	4
9	6801 6211	Top Stay	2
10	6769 2272	Antistatic Brush	2
11	A490 6001	Upper Cover	1
12	A490 7802	Misfeed Removal Decal	1
13	A490 6141	Hinge Cover	1
14	A490 5960	Sorter Bracket	1
15	A490 6131	Rear Cover	1
16	5447 2681	Snap Ring	1
17	A490 1020	Upper Hinge Bracket	1
18	A490 1021	Lower Hinge Bracket	1
19	6802 7125	Magnet - Sorter Mounting Base	1
20	A490 7511	Magnet Catch Bracket	1
21	A490 5951	Sensor Bracket	1
22	6802 5640	Reed Switch	1
23	6802 5839	Cord Clamp Rivet	1
24	6801 5600	Sorter Main Harness	1
25	6802 5838	Cord Clamp - M16	1
26	6802 3161	Antistatic Brush - Bin	1
27	AA14 0279	Frame Shaft	1
28	A490 1011	Sorter Frame	1
29	A490 6121	Front Support Cover	1
30	A490 6011	Front Cover	1
31	A490 7803	Arrow Decal	1
32	A490 3146	Front Mylar Seal - Top Bin	1
33	A490 3147	Rear Mylar Seal - Top Bin	1
34	6802 5971	Home Position Switch Cover MB1 (Added)	1

Index No.	Part No.	Description	Q'ty per Assembly
101	0313 0060W	Philips Pan Head Screw - M3x6	
102	0313 0160W	Philips Pan Head Screw - M3x16	
	0313 0140W	Philips Pan Head Screw - M3x14 x/o MB1	
103	0314 0060W	Philips Pan Head Screw - M4x6	
104	0314 0080M	Philips Pan Head Screw - M4x8	
105	0314 0080W	Philips Pan Head Screw - M4x8	
106	0315 0080M	Philips Pan Head Screw - M5x8	
107	0324 0080Z	Sunk Screw - 4x8	
108	0354 0080F	Screw - M4x8	
109	0354 0100F	Screw - M4x10	
110	434 0060W	Tapping Screw - M4x6	
111	0700 0040B	Flat Washer - M4 100 Pcs/Set	
112	0704 0040C	Toothed Washer - M4	
113	0960 3006W	Philips Flange Screw - M3x6	
114	1005 0335	Earth Mark	
115	1105 0087	Clamp	
116	1106 0366	Cord Clamp	
117	1107 0406	Fuse - 250V,0.5A	
118	1107 0409	Fuse - 250V,1A	
119	1204 1376	Microswitch	
120	0314 0050W	Philips Pan Head Screw - M4x5	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2. TRANSPORT (A490)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
1	6802 5720	Grounding Wire	2
2	6802 5703	Grounding Wire	1
3	6802 2032	Antistatic Brush Angle	1
4	A490 2014	Antistatic Brush - Upper Guide	1
5	6801 2021	Upper Exit Roller	1
6	A490 2013	Upper Guide Plate	1
7	6802 2357	Exit Sensor Feeler	1
8	6802 2355	Exit Sensor Bracket	1
9	6801 5921	Harness Guidebracket	1
10	6801 5520	Exit Sensor Board	1
11	6801 5911	Insulating Sheet - Exit Sensor	1
12	A490 1011	Sorter Frame	1
13	6802 1025	Up-down Plate Guide	2
14	6802 1021	Front Slot Liner	1
15	6802 2239	Slot Roller	2
16	6802 2233	Transfer Wheel - A	1
17	6802 2317	Timing Belt - 80XL	1
18	6802 2217	Parallel Key	2
19	6802 2215	Bushing	2
20	6801 2123	Lower Exit Roller	1
21	6802 2213	Bin Drive Shaft	1
22	6802 2237	Transfer Wheel - B	1
23	6802 1023	Rear Slot Liner	1
24	6802 2117	Shaft - Lower Guide Plate	2
25	6801 5600	Sorter Main Harness	1
26	6802 2313	Timing Pulley - 12T	1
27	6802 2315	Drive Pulley Shaft	1
28	6802 5406	Bin Drive Motor	1
29	A423 5410	DC Motor - 24V 2.9W	1
30	6801 2331	Bracket - Roller Drive Motor	1
31	6801 2335	Roller Drive Pulley	1
32	6801 2322	Belt - M3 x 175	1
33	A467 2510	Guide Plate	1
34	6801 2115	Lower Guide Plate	1

Index No.	Part No.	Description	Q'ty per Assembly
35	6802 5972	Wheel Switch Cover MB1 (Added)	1
101	0313 0050W	Philips Pan Head Screw - M3x5	
102	0313 0160W	Philips Pan Head Screw - M3x16	
	0313 0140W	Philips Pan Head Screw - M3x14 x/o MB1	
103	0314 0060W	Philips Pan Head Screw - M4x6	
104	0434 0060W	Tapping Screw - M4x6	
105	0720 0040E	Retaining Ring - M4	
106	0965 3008W	Tapping Screw With Flat Washer - M3x8	
107	0965 3010W	Tapping Screw With Flat Washer - M3x10	
108	0965 4008W	Tapping Screw With Flat Washer - M4x8	
109	1204 1376	Microswitch	

MC-Service

CAPACITOR

SYMBOL NO.	INDEX NO.
C101	121
C102	120
C103	122
C104	122
C105	122
C106	122
C107	122
C108	121
C109	121
C110	122

SYMBOL NO.	INDEX NO.
C111	122
C112	123
C113	123

CONNECTOR

SYMBOL NO.	INDEX NO.
CN101	103
CN102	104
CN103	102

DIODE

SYMBOL NO.	INDEX NO.
D101	112
D102	112

FUSE RESISTOR

SYMBOL NO.	INDEX NO.
FR101	118

FUSE

SYMBOL NO.	INDEX NO.
FU101	106
(FU101)	105
FU102	107
(FU102)	105

IC

SYMBOL NO.	INDEX NO.
IC101	117
IC102	115
IC103	114
IC104	113
IC105	116
(IC105)	101

TRANSISTOR ARRAY

SYMBOL NO.	INDEX NO.
PU101	111

TRANSISTOR

SYMBOL NO.	INDEX NO.
Q101	110
Q102	108
Q103	109
Q104	109

RESISTOR

SYMBOL NO.	INDEX NO.
R101	124
R102	129
R103	126
R104	124
R105	127
R106	128
R107	128
R108	128
R109	127
R110	128

SYMBOL NO.	INDEX NO.
R111	128
R112	128
R113	130
R114	130
R115	130
R116	130
R117	124
R118	124
R119	124
R120	124

SYMBOL NO.	INDEX NO.
R121	124
R122	124
R123	125

RC ARRAY

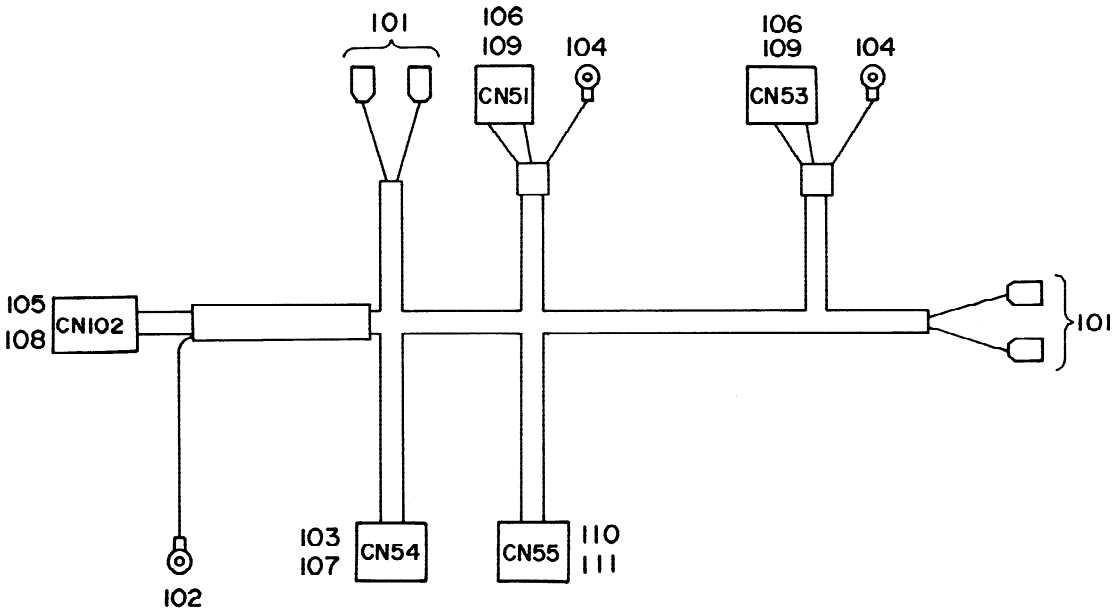
SYMBOL NO.	INDEX NO.
RC101	119
RC102	119

3. SORTER MAIN BOARD (A490)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
*	6801 5510	Sorter Mian Board	1

Index No.	Part No.	Description	Q'ty per Assembly
101	1005 0799	Heat Sink - H0-220	
102	1103 1690	Connector - 10P	
103	1103 1732	Connector - 10P	
104	1103 1735	Connector - 13P	
105	1104 0307	Fuse Clip	
106	1107 0406	Fuse - 250V,0.5A	
107	1107 0409	Fuse - 250V,1A	
108	1400 0072	Transistor - 2SC372Y	
109	1400 0135	Transistor - 2SA1015-Y	
110	1400 0212	Transistor - 2SB605	
111	1401 0325	Transistor Array - PU4320	
112	1401 0832	Diode - DSA1A1	
113	1407 1607	IC - TD62603P	
114	1407 1698	IC - TD62801P	
115	1407 1807	IC - TC40H151P	
116	1408 0306	IC - 78012AP	
117	1408 0408	IC - PST518A	
118	1601 7531	Fuse Resistor - 15 Ohm +-5%3W	
119	1602 0934	RC Array - CR01-R	
120	1604 1382	Capacitor - 10uF 50V	
121	1604 1488	Capacitor - 35V,47MF	
122	1606 1109	Capacitor - 50V,0.1MF	
123	1606 1336	Capacitor - 10000pF -20% +80% 50V	
124	1611 4102	Resistor - 1K Ohm 1/4T +-5%	
125	1611 4121	Resistor - 120 Ohm 1/4T +-5%	
126	1611 4153	Resistor - 15K Ohm 1/4T +-5%	
127	1611 4222	Resistor - 2.2K Ohm 1/4T +-5%	
128	1611 4472	Resistor - 4.7K Ohm +-5% 1/4W	
129	1611 4473	Resistor - 47K Ohm 1/4T +-5%	
130	1611 6222	Resistor - 2.2K Ohm 1/2T +-5%	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4. SORTER MAIN HARNESS (A490)

Index No.	Part No.	Description	Q'ty per Assembly
*	6801 5600	Sorter Main Harness	1

Index No.	Part No.	Description	Q'ty per Assembly
101	1100 0298	Solid Strand	
102	1100 0505	Ground Terminal	
103	1100 0861	Socket Terminal - Large	
104	1100 1264	Wire Terminal	
105	1100 1327	Contact	
106	1100 1328	Contact	
107	1102 0415	Connector Housing	
108	1102 1921	Connector - 13P	
109	1102 1964	Connector - 2P	
110	6802 5817	Connector - 5P	
111	6802 5823	Key - PK100C	

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5. DECAL AND DOCUMENT (A490)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
1	A490 7802	Misfeed Removal Decal	1
2	A490 7803	Arrow Decal	1

Index No.	Part No.	Description	Q'ty per Assembly

PARTS INDEX

Part No.	Description	Paper and Index No.
A490 1011	Sorter Frame	3-28
A490 1011	Sorter Frame	5-12
A490 1020	Upper Hinge Bracket	3-17
A490 1021	Lower Hinge Bracket	3-18
A490 2013	Upper Guide Plate	5- 6
A490 2014	Antistatic Brush - Upper Guide	5- 4
A490 3005	Sorter Bin - Top	3- 5
A490 3146	Front Mylar Seal - Top Bin	3-32
A490 3147	Rear Mylar Seal - Top Bin	3-33
A490 5610	Interface Harness	3- 1
A490 5951	Sensor Bracket	3-21
A490 5960	Sorter Bracket	3-14
A490 6001	Upper Cover	3-11
A490 6011	Front Cover	3-30
A490 6121	Front Support Cover	3-29
A490 6131	Rear Cover	3-15
A490 6141	Hinge Cover	3-13
A490 7511	Magnet Catch Bracket	3-20
A490 7802	Misfeed Removal Decal	3-12
A490 7802	Misfeed Removal Decal	11- 1
A490 7803	Arrow Decal	3-31
A490 7803	Arrow Decal	11- 2

Part No.	Description	Paper and Index No.
AA14 0279	Frame Shaft	3-27
A414 3111	Sorter Bin - Odd	3- 8
A414 3151	Sorter Bin - Even	3- 7
A423 5410	DC Motor - 24V 2.9W	5-29
A467 2510	Guide Plate	5-33
A467 6161	Lower Cover	3- 3
5447 2681	Snap Ring	3-16
6769 2272	Antistatic Brush	3-10
6801 2021	Upper Exit Roller	5- 5
6801 2115	Lower Guide Plate	5-34
6801 2123	Lower Exit Roller	5-20
6801 2322	Belt - M3 x 175	5-32
6801 2331	Bracket - Roller Drive Motor	5-30
6801 2335	Roller Drive Pulley	5-31
6801 3145	Paper Stopper	3- 6
6801 5510	Sorter Main Board	3- 2
6801 5510	Sorter Mian Board	7- *
6801 5520	Exit Sensor Board	5-10
6801 5600	Sorter Main Harness	3-24
6801 5600	Sorter Main Harness	5-25
6801 5600	Sorter Main Harness	9- *
6801 5911	Insulating Sheet - Exit Sensor	5-11
6801 5921	Harness Guidebracket	5- 9
6801 6211	Top Stay	3- 9
6802 1021	Front Slot Liner	5-14
6802 1023	Rear Slot Liner	5-23
6802 1025	Up-down Plate Guide	5-13
6802 2032	Antistatic Brush Angle	5- 3
6802 2117	Shaft - Lower Guide Plate	5-24
6802 2213	Bin Drive Shaft	5-21
6802 2215	Bushing	5-19
6802 2217	Parallel Key	5-18
6802 2233	Transfer Wheel - A	5-16
6802 2237	Transfer Wheel - B	5-22
6802 2239	Slot Roller	5-15

Part No.	Description	Paper and Index No.
6802 2313	Timing Pulley - 12T	5- 26
6802 2315	Drive Pulley Shaft	5- 27
6802 2317	Timing Belt - 80XL	5- 17
6802 2355	Exit Sensor Bracket	5- 8
6802 2357	Exit Sensor Feeler	5- 7
6802 3161	Antistatic Brush - Bin	3- 26
6802 5406	Bin Drive Motor	5- 28
6802 5640	Reed Switch	3- 22
6802 5703	Grounding Wire	5- 2
6802 5720	Grounding Wire	5- 1
6802 5817	Connector - 5P	9-110
6802 5823	Key - PK100C	9-111
6802 5838	Cord Clamp - M16	3- 25
6802 5839	Cord Clamp Rivet	3- 23
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Part No.	Description	Paper and Index No.

DF57 (A318)

PARTS CATALOG

INTRODUCTION

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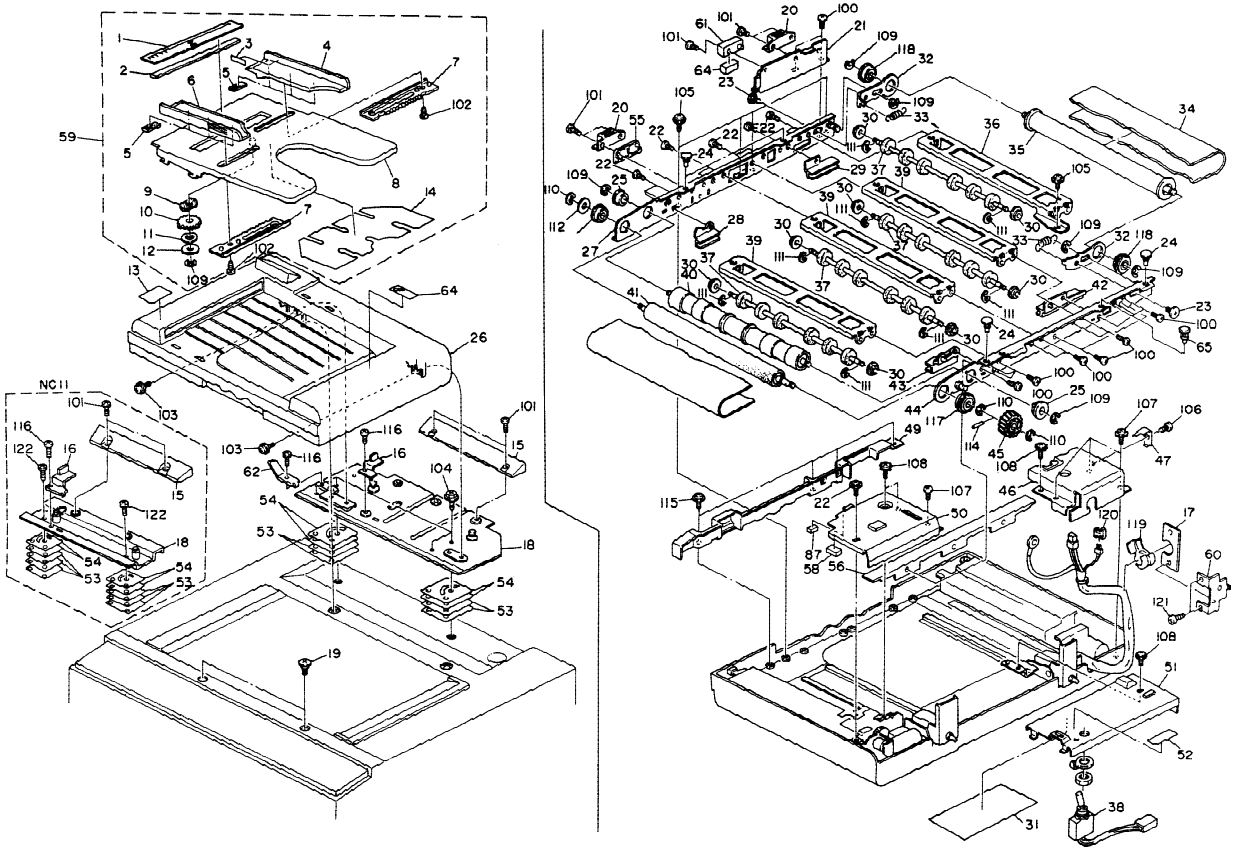
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1. EXTERIOR AND TRANSPORT SECTION (A318)

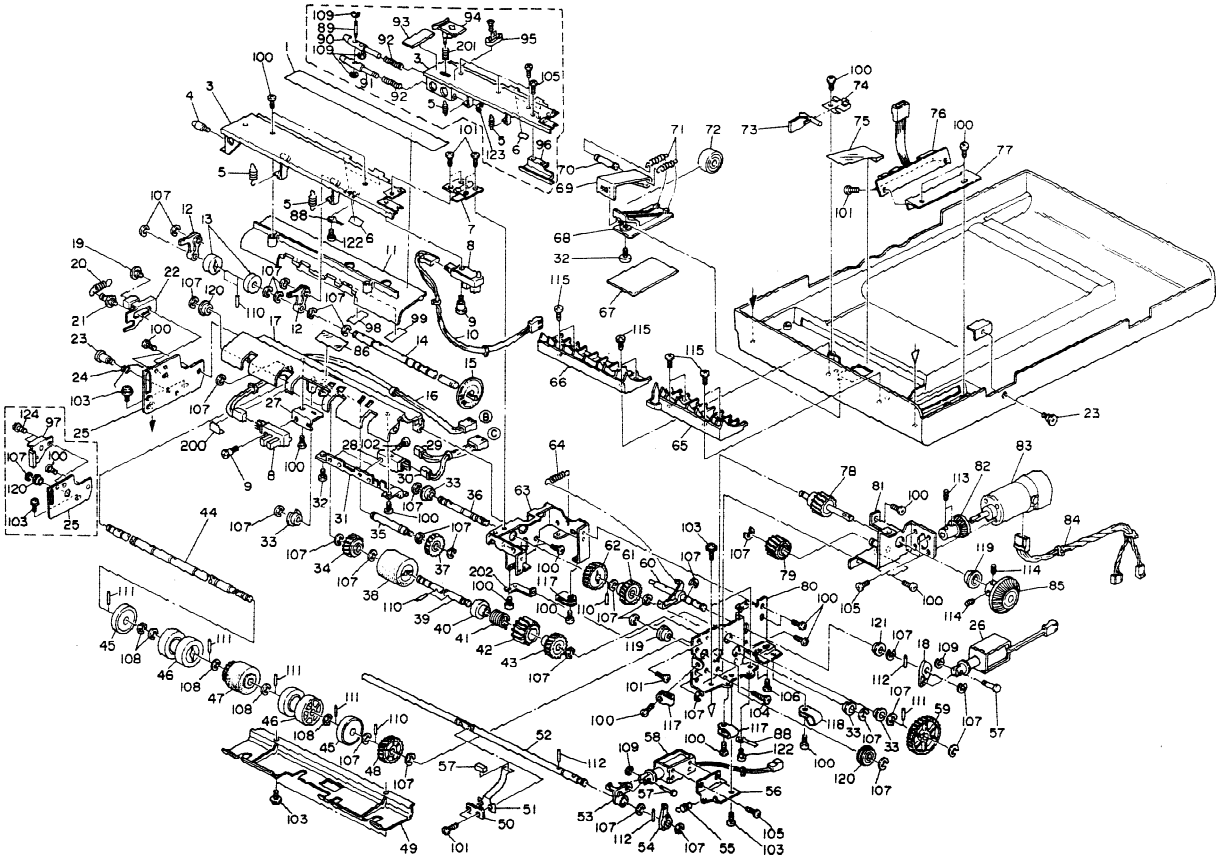
December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
1	A465 1337	Decal - Original Table - LT	1
1	A465 1338	Decal - Original Table - A4	1
2	A422 1335	Magnet - Original Table	1
3	A465 2025	Original Limit Decal	1
4	A422 1376	Rear Side Guide	1
5	5894 2747	Mylar - Original Guides	6
6	A422 1366	Front Side Guide	1
7	A422 1361	Rack - Side Guide	2
8	A422 1323	Original Table	1
9	5443 2712	Cork Pad	1
10	5443 2657	Gear - 28Z	1
11	5443 2713	Wave Washer	1
12	5443 2660	Spacer - 6x22x0.5mm	1
13	A465 2010	Misfeed Removal Decal - English	1
13	A465 2050	Misfeed Removal Decal - Multi	1
14	A422 1385	Original Exit Guide	1
15	A465 1125	Angle Stopper	1
16	A465 1398	Lift Switch Actuator	1
17	A437 1178	DF Harness Bracket	1
18	A318 1191	Mounting Bracket	1
18	A465 1195	Mounting Bracket	1
19	A422 1381	Shoulder Screw - M4	2
20	5936 2480	Magnet Catch Ass'y	2
21	A318 1135	Magnet Catch Bracket	1
22	5875 2088	Shoulder Screw - M4	6
23	AA14 3005	Stepped Screw - M4x2.5	2
24	A422 1108	Stopper	2
25	A422 1078	Bushing - 6x12x4mm	2
26	A318 1300	DF Upper Cover	1
27	A318 1100	Front Frame	1
28	A422 1185	Belt Guide - Front Left	1
29	A422 1187	Belt Guide - Front Right	1
30	5447 3655	Bushing - 4mm	8
31	A465 2017	Decal - DIP Switch	1
32	A437 1120	Bracket - Belt Tension Spring	1

Index No.	Part No.	Description	Q'ty per Assembly
33	A422 1112	Belt Tension Spring	2
34	A465 1127	Transport Belt	1
35	A422 1114	Driven Roller - Transport Belt	1
36	A422 1106	Stay	1
37	A465 1118	Belt Support Roller	4
38	5936 5348	Thin Original Feed Switch	1
39	A422 1107	Stay - Belt Support Roller	3
40	A497 1101	Belt Pressure Roller	1
41	A437 1115	Drive Roller - Transport Belt	1
42	A422 1188	Belt Guide - Rear Right	1
43	A422 1186	Belt Guide - Rear Left	1
44	A422 1103	Rear Frame	1
45	A422 1056	Gear - 19T	1
46	A318 1184	Feed-out Motor Cover	1
47	A437 1190	Grounding Plate	1
49	A318 1331	Grip Cover	1
50	A318 1498	Belt Drive Motor Cover	1
51	A422 1183	Main Board Cover	1
52	5936 7901	Decal - English	1
53	A465 1397	Spacer - 0.5mm	4
54	A465 1389	Spacer - 0.2mm	4
55	A465 1110	Magnet Catch Spacer	1
56	A422 1130	Reflector Plate	1
57	A422 1603	Seal - 2x8x14	1
58	A422 1604	Cushion - 8x15x25	1
59	A465 0656	Original Table Ass'y - LT	1
59	A465 0657	Original Table Ass'y - A4	1
60	A465 1179	DF Bracket	1
61	A497 1152	Magnet - APS	1
62	A318 1530	DF Halfway Sensor Actuator	1
63	A497 2025	Cushion - 5x5x3	2
64	A465 2031	Decal - Set	1
65	A422 1066	Stopper	1

Index No.	Part No.	Description	Q'ty per Assembly
100	0314 0060W	Philips Pan Head Screw - M4x6	
101	0353 0050W	Tapping Screw - M3x5	
102	0413 0082W	Tapping Screw - M3x8	
103	0951 4005W	Philips Screw With Flat Washer - M4x5	
104	0584 0103W	Hexgon With Flange Screw - M4x10	
105	0951 4006W	Philips Screw With Flat Washer - M4x6	
106	0951 3006B	Philips Screw with Flat Washer - M3x6	
107	0344 0060W	Philips Truss Head Screw - M4x6	
108	0801 1185	Philips Truss Head Screw - M4x8	
109	0720 0040E	Retaining Ring - M4	
110	0720 0050E	Retaining Ring - M5	
111	0720 0030E	Retaining Ring - M3	
112	0701 0060B	Flat Washer - M6	
114	0632 0100G	Pin - 2x10mm	
115	0344 0600D	Philips Truss Head Screw - M4x6	
116	0313 0050W	Philips Pan Head Screw - M3x5	
117	0742 3906	Ball Bearing - 6mm	
118	0741 3806	Ball Bearing - 6x13x5mm	
119	1106 0222	Cord Clamp	
120	1100 0340	Closed Terminal	
121	0314 0050W	Philips Pan Head Screw - M4x5	
122	0315 0100W	Philips Pan Head Screw - M5x10	

Index No.	Part No.	Description	Q'ty per Assembly



2. FEED IN SECTION (A318)

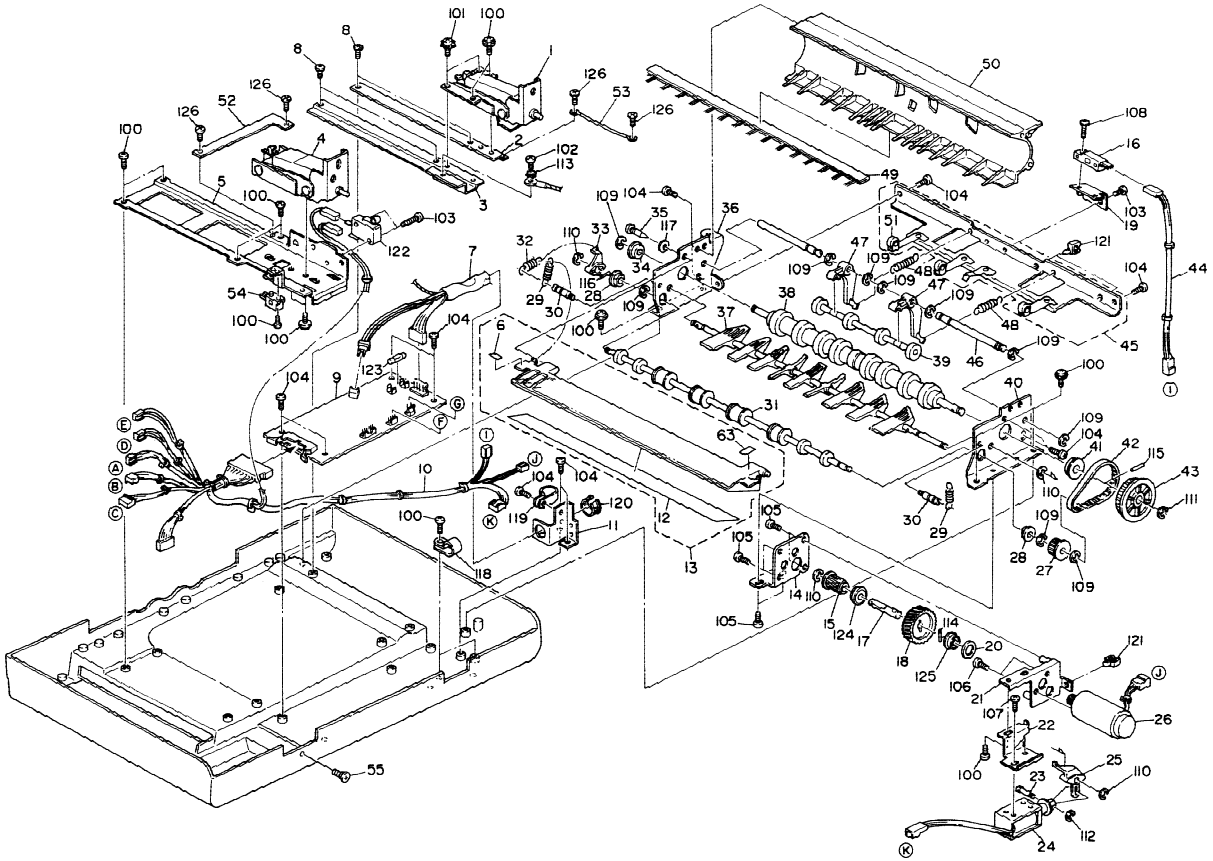
December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
1	A497 1077	Mylar - 18x306	1
3	A465 1057	Pull-out Bracket	1
4	5413 3903	Pin - Transfer Guide Plate	1
5	A422 1086	Pull-out Spring	2
6	A422 1063	Seal - 0.7x13x20	2
7	A422 1064	Hinge - Pull-out	1
8	5205 5250	LED Sensor Type - S	2
9	A422 1087	Shoulder Screw - M3x3	2
10	A422 5202	Harness - Pulse Generator	1
11	A437 1065	Lower Guide Plate	1
12	A422 1071	Pull-out Lever	2
13	A422 1068	Relay Roller	2
14	A422 1067	Relay Roller Shaft	1
15	A422 1080	Pulse Generator	1
16	A422 5201	Interface Harness	1
17	A437 1026	Upper Guide Plate	1
18	A422 1040	Feed-in Solenoid Lever	1
19	AA14 3005	Stepped Screw - M4x2.5 MB5	1
20	5446 4577	Spring - Turn Plate MB5	1
21	A422 1074	Shoulder Screw - M4x2.5 MB5	1
22	A422 1075	Feed-in Unit Relese Lever MB5	1
23	5219 1957	Stepped Screw - M4 MB5	1
24	A422 1073	Release Spring	1
25	A422 1072	Front Side Plate	1
26	A422 5252	Solenoid - DC24V	1
27	A422 1047	Set Sensor Bracket	1
28	A422 5270	Photosensor	2
29	A422 5207	Harness - Registration	1
30	A422 5208	Harness - Paper Size	1
31	A422 1093	Sensor Bracket	1
32	5875 2088	Shoulder Screw - M4	2
33	A422 1078	Bushing - 6x12x4mm	4
34	A422 1051	Gear - 23T	1
35	A422 1044	Idle Shaft	1
36	A422 1503	Idle Shaft	1

Index No.	Part No.	Description	Q'ty per Assembly
37	A422 1042	Idle Gear - 22Z	1
38	A422 1046	Pick-up Roller	1
39	A422 1048	Pick-up Shaft	1
40	A422 1002	Clutch Boss	1
41	5918 2163	Clutch Spring	1
42	5918 2164	Clutch Sleeve	1
43	A422 1001	Gear - 24T	1
44	A422 1023	Feed Roller Shaft	1
45	A422 1045	Pull-out Roller	2
46	A318 1090	Side Roller	2
47	A422 1003	Feed Roller	1
48	A422 1041	Gear - 27T	1
49	A422 1025	Original Guide	1
50	A422 1602	Pick-up Lever Plate	1
51	A422 1600	Pick-up Lever	1
52	A422 1601	Pick-up Shaft	1
53	A422 1032	Lever - Pick-up Solenoid	1
54	A422 1031	Lever - Pick-up Spring	1
55	A422 1082	Pick-up Spring	1
56	A422 1033	Pick-up Solenoid Bracket	1
57	5894 2229	Solenoid Pin	2
58	A422 5255	Solenoid - DC24V (Invertor)	1
59	A422 1505	Gear - 57T	1
60	A422 1005	Clutch Pawl - Pick-up Roller	1
61	A422 1049	Gear - 27T	1
62	A422 1050	Gear - 29T	1
63	A318 1021	Side Plate	1
64	5894 2176	Spring - Detent Arm	1
65	A422 1291	Rear Guide Plate	1
66	A422 1290	Front Guide Plate	1
67	A422 1351	Seal - 0.5x37x71mm	1
68	A422 1352	Friction Belt Holder	1
69	A422 1354	Friction Belt	1
70	A422 1356	Pin - 3x26mm	1
71	A422 1355	Friction Belt Spring	2

Index No.	Part No.	Description	Q'ty per Assembly
72	A422 1069	Friction Roller	1
73	A422 1295	Set Sensor Actuator	1
74	A422 1176	Set Sensor Actuator Bracket	1
75	A422 1390	Entrance Seal	1
76	A465 5260	Indication Board	1
77	A422 1177	Indication Bracket	1
78	A422 1504	Shaft/Gear - 16T	1
79	A422 1506	Gear - 25T	1
80	A318 1510	Rear Side Plate	1
81	A422 1507	Feed-in Motor Bracket	1
82	A422 1501	Gear - 20T	1
83	A422 5300	Feed-in Motor - DC10W	1
84	A422 5204	Feed-in Motor Harness	1
85	A497 1015	Gear - 45Z	1
86	A422 1396	Mylar - 0.125x14x45.5	1
87	A422 1603	Seal - 2x8x14	1
88	A422 5212	Grounding Wire	1
89	A465 1075	Shaft - 3x25	1
90	A465 1074	Pin - 4x77.5	1
91	A465 1073	Pin - 4x76.5	1
92	A465 1072	Lock Spring	2
93	A465 1068	Cushion - 2.5x14x43	1
94	A465 1077	Release Lever	1
95	A465 1076	Release Lever Knob	1
96	A465 1069	Harness Cover	1
97	A465 1080	Fixing Plate - Feed-in Unit	1
98	A465 1066	Mylar - 0.1x21x58	1
99	A465 1067	Mylar - 0.1x14.5x44	1
200	A465 1027	Guide Plate - Paper Feed	2
201	A465 1070	Lever Spring	1
202	A422 1022	Support Plate	1

Index No.	Part No.	Description	Q'ty per Assembly
100	0314 0060W	Philips Pan Head Screw - M4x6	
101	0313 0060W	Philips Pan Head Screw - M3x6	
102	0951 3010W	Philips Screw With Flat Washer - M3x10	
103	0951 4006W	Philips Screw With Flat Washer - M4x6	
104	0313 0120W	Philips Pan Head Screw - M3x12	
105	0313 0040W	Philips Pan Head Screw - M3x4	
106	0951 3004W	Philips Screw with Flat Washer - M3x4	
107	0720 0040E	Retaining Ring - M4	
108	0720 0060E	Retaining Ring - M6	
109	0720 0025E	Retaining Ring - M2.5	
110	0632 0100G	Pin - 2x10mm	
111	0632 0140G	Parallel Pin	
112	0632 0080G	Parallel Key - 2x8mm	
113	0573 0030E	Hexagon Headless Set Screw - M3x3	
114	0573 0060E	Hexagon Headless Set Screw - M3x6	
115	0354 0060W	Philips Truss Head Screw - M4x6	
116	1105 0199	Clamp	
117	1105 0008	Nylon Clip - 2N	
118	1105 0009	Nylon Clip - 5N	
119	0741 3505	Ball Bearing - 5x10x4	
120	0741 3506	Ball Bearing - 6x12x4 mm	
121	0805 3383	Bushing - M5	
122	0950 4006W	Philips Screw With Lock Washer - M4x6	
123	0720 0030E	Retaining Ring - M3	
124	0951 4005W	Philips Screw With Flat Washer - M4x5	



3. INVERTOR AND EXIT SECTION (A318)

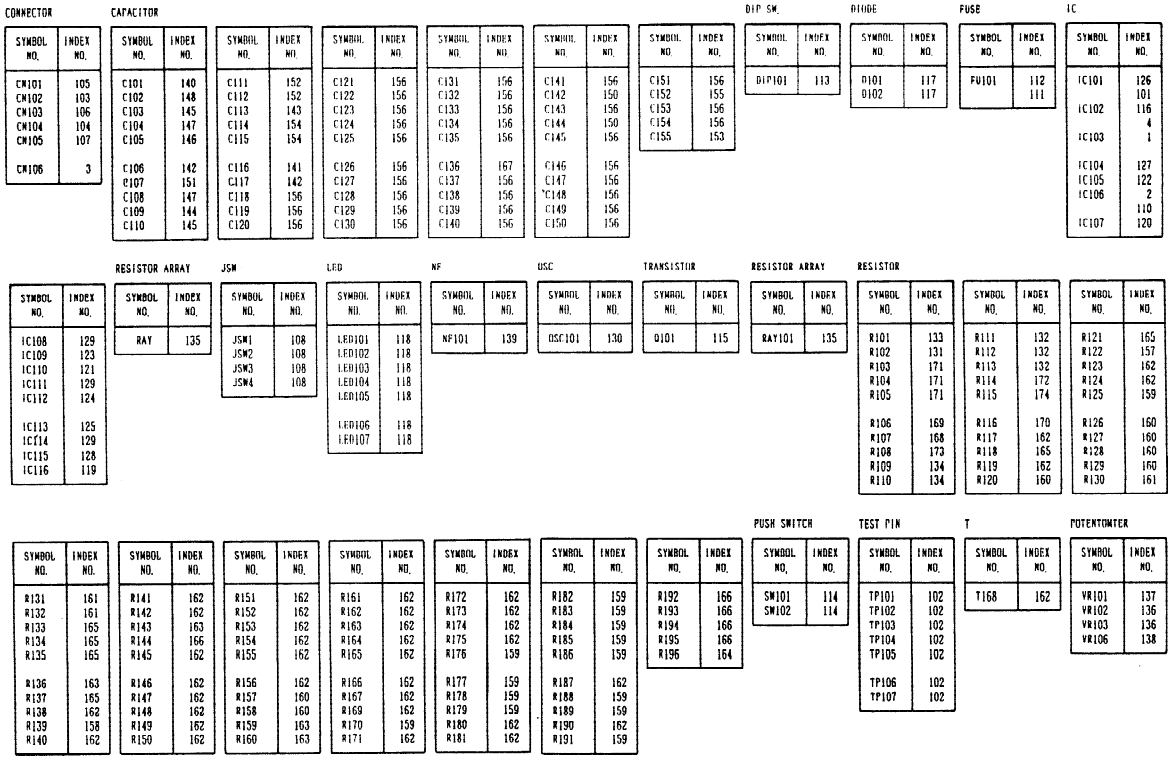
December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
1	A465 1499	Right Hinge	1
2	A422 1121	Right Bracket - Right Hinge	1
3	A422 1120	Left Bracket - Right Hinge	1
4	A465 1393	Left Hinge	1
5	A318 1119	Left Hinge Bracket	1
6	A422 2030	Decal - Inverter Guide Plate	1
7	A318 5205	Interface Harness	1
8	5875 2088	Shoulder Screw - M4	4
9	A465 5190	DF Main Board	1
10	A318 5220	Main Harness	1
11	A497 1500	I/F Harness Bracket	1
12	A497 2024	Paper Guide Mylar	1
13	A422 1225	Inverter Guide Plate	1
14	A422 1260	Front Side Plate	1
15	A409 1192	Pulley - 15T	1
16	A422 5270	Photosensor	1
17	A409 1195	Exit Drive Shaft	1
18	A422 1265	Gear - 46T	1
19	A422 1251	Bracket - Exit Sensor	1
20	A409 1197	Spacer - 10x16x1.6mm	1
21	A422 1261	Rear Side Plate	1
22	A422 1232	Inverter Solenoid Bracket	1
23	5894 2229	Solenoid Pin	1
24	A422 5255	Solenoid - DC24V (Invertor)	1
25	A422 1235	Rear Lever	1
26	A422 5310	Feed-out Motor - DC10W	1
27	A409 1161	Pulley - 21T	1
28	5053 0447	Bushing - 6mm	2
29	A422 1226	Spring - Inverter Guide Plate	2
30	A409 1150	Spring Anchor	2
31	A422 1240	Upper Exit Roller	1
32	A422 1231	Inverter Gate Spring	1
33	A422 1234	Front Lever	1
34	A422 1078	Bushing - 6x12x4mm	1
35	5446 2824	Screw - Duplex Guide Plate	1

Index No.	Part No.	Description	Q'ty per Assembly
36	A422 1275	Front Side Plate - Feed-out	1
37	A422 1230	Inverter Pawls	1
38	A422 1210	Inverter Roller	1
39	A422 1216	Inverter Support Roller	1
40	A422 1276	Rear Side Plate - Feed-out	1
41	A422 1079	Bushing - 8x16x5mm	1
42	A422 1270	Timing Belt - 81xl	1
43	A409 1143	Pulley - 50T	1
44	A422 5203	Feed-out Sensor Harness	1
45	A422 1245	Upper Exit Roller Ass'y	1
46	A422 1218	Pressure Lever Shaft	1
47	A422 1217	Pressure Lever	2
48	A422 1219	Pressure Lever Spring	2
49	A422 1257	Antistatic Brush	1
50	A422 1255	Invertor Guide Plate	1
51	A422 1249	Upper Exit Roller	4
52	A465 1126	Grounding Plate	1
53	A465 5213	Grounding Wire	1
54	AW01 0010	Photosensor	1
55	5219 1957	Stepped Screw - M4	1

Index No.	Part No.	Description	Q'ty per Assembly
100	0951 4006W	Philips Screw With Flat Washer - M4x6	
101	0801 1185	Philips Truss Head Screw - M4x8	
102	0314 0060M	Philips Pan Head Screw - M4x6	
103	0313 0140W	Philips Pan Head Screw - M3x14	
104	0314 0060W	Philips Pan Head Screw - M4x6	
105	0951 3006W	Philips Screw With Flat Washer - M3x6	
106	0313 0060W	Philips Pan Head Screw - M3x6	
107	0313 0040W	Philips Pan Head Screw - M3x4	
108	0951 3010W	Philips Screw With Flat Washer - M3x10	
109	0720 0040E	Retaining Ring - M4	
110	0720 0030E	Retaining Ring - M3	
111	0720 0060E	Retaining Ring - M6	
112	0720 0025E	Retaining Ring - M2.5	
113	0704 0040C	Toothed Washer - M4	
114	0632 0100G	Pin - 2x10mm	
115	0633 0120G	Parallel Pin - 3x12	
116	0632 0080G	Parallel Key - 2x8mm	
117	0701 0040B	Flat Washer - M4	
118	1105 0009	Nylon Clip - 5N	
119	1105 0011	Nylon Clip - 8N	
120	1106 0430	Bushing - 13mm	
121	1105 0199	Clamp	
122	1204 1319	Microswitch	
123	1107 0413	Fuse - 3A 125V	
124	0742 3905	Ball Bearing - 5x13x4mm	
125	0741 3505	Ball Bearing - 5x10x4	
126	0950 4006W	Philips Screw With Lock Washer - M4x6	

Index No.	Part No.	Description	Q'ty per Assembly



CONNECTOR

SYMBOL NO.	INDEX NO.
CN101	105
CN102	103
CN103	106
CN104	104
CN105	107
CN106	3

CAPACITOR

SYMBOL NO.	INDEX NO.
C101	140
C102	148
C103	145
C104	147
C105	146
C106	142
C107	151
C108	147
C109	144
C110	145
C111	152
C112	152
C113	143
C114	154
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C116	141
C117	142
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C136	167
C137	156
C138	156
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C142	150
C143	156
C144	150
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C146	156
C147	156
C148	156
C149	156
C150	156
C151	156
C152	155
C153	156
C154	156
C155	153

DIP SW

SYMBOL NO.	INDEX NO.
DIP101	113

DIODE

SYMBOL NO.	INDEX NO.
D101	117
D102	117

FUSE

SYMBOL NO.	INDEX NO.
FU101	112
	111

IC

SYMBOL NO.	INDEX NO.
IC101	126
	101
IC102	116
	4
IC103	1
IC104	127
IC105	122
IC106	2
	110
IC107	120
IC108	129
IC109	123
IC110	121
IC111	129
IC112	124
IC113	125
IC114	129
IC115	128
IC116	119

RESISTOR ARRAY

SYMBOL NO.	INDEX NO.
RAY	135

JSW

SYMBOL NO.	INDEX NO.
JSW1	108
JSW2	108
JSW3	108
JSW4	108

LED

SYMBOL NO.	INDEX NO.
LED101	118
LED102	118
LED103	118
LED104	118
LED105	118
LED106	118
LED107	118

NF

SYMBOL NO.	INDEX NO.
NF101	139

OSC

SYMBOL NO.	INDEX NO.
OSC101	130

TRANSISTOR

SYMBOL NO.	INDEX NO.
Q101	115

RESISTOR ARRAY

SYMBOL NO.	INDEX NO.
RAY101	135

RESISTOR

SYMBOL NO.	INDEX NO.
R101	133
R102	131
R103	171
R104	171
R105	171
R106	169
R107	168
R108	173
R109	134
R110	134
R111	132
R112	132
R113	132
R114	172
R115	174
R116	170
R117	162
R118	165
R119	162
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R121	165
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R123	162
R124	162
R125	159
R126	160
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R181	162
R182	159
R183	159
R184	159
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PUSH SWITCH

SYMBOL NO.	INDEX NO.
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SW102	114

TEST PIN

SYMBOL NO.	INDEX NO.
TP101	102
TP102	102
TP103	102
TP104	102
TP105	102
TP106	102
TP107	102

T

SYMBOL NO.	INDEX NO.
T168	162

POTENTOMTER

SYMBOL NO.	INDEX NO.
VR101	137
VR102	136
VR103	136
VR106	138

4. MAIN BOARD (A318)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
*	A465 5190	DF Main Board	1
1	A422 5350	IC - HCTL-3	1
2	A465 5180	IC - D27128A-2	1
3	A465 5210	Fiber Connector - 2P	1
4	5936 5221	Heat Sink	1

Index No.	Part No.	Description	Q'ty per Assembly
101	1005 0843	Heat Sink - OSH2425SP	
102	1101 0328	Connector Pin Contact	
103	1102 0958	Connector - 2P	
104	1102 2966	Connector - HIF3BA-34PA	
105	1103 0881	Connector - 4P	
106	1103 1726	Connector - 4P	
107	1103 1729	Connector - 7P	
108	1103 1878	Connector - 2P	
110	1104 0271	LSI Socket - 28P	
111	1104 0333	Fuse Holder	
112	1107 0413	Fuse - 3A 125V	
113	1204 0883	DIP Switch	
114	1204 1385	Push Switch	
115	1401 0282	Transistor - 2SB1020	
116	1401 0329	Transistor Array - MP4503	
117	1401 0832	Diode - DSA1A1	
118	1403 0308	LED - TLR-102A	
119	1403 0388	Photocoupler - ON3111	
120	1407 0602	IC - TC4040BP	
121	1407 0604	IC - TC4049BP	
122	1407 1026	IC - SN74LS373N	
123	1407 1334	IC - UPD7810G	
124	1407 1348	IC - TD62304AP	
125	1407 1535	IC - TD62308AP	
126	1408 0076	IC - UPC14312H	
127	1408 0408	IC - PST518A	
128	1408 0521	IC - M51971L	
129	1408 0578	IC - HA17339	
130	1503 0070	Ceramic Oscillator - 10MHz	
131	1600 0239	Resistor - 0.47 Ohm +-5% 1W	
132	1600 0544	Resistor - 1k Ohm +-10% 1W	
133	1600 0576	Resistor - 33 Ohm +-10% 5W	
134	1601 1732	Resistor - 390 Ohm +-5% 1W	
135	1601 7326	Resistor Array - 10k Ohm	
136	1601 8145	Variable Resistor - 5k Ohm 0.5W	

Index No.	Part No.	Description	Q'ty per Assembly
137	1601 8147	Variable Resistor - 10k Ohm 0.5W	
138	1601 8148	Variable Resistor - 20k Ohm 0.5W	
139	1602 0953	Coil - 800uH 2.5A	
140	1604 1358	Capacitor - 1000mF 10V	
141	1604 1378	Capacitor - 1mF 50V	
142	1604 1379	Capacitor - 2.2uF +-20% 50V	
143	1604 1380	Capacitor - 3.3uF 50V	
144	1604 1381	Capacitor - 4.7uF 50V	
145	1604 1382	Capacitor - 10uF 50V	
146	1604 1383	Capacitor - 22mF 50V	
147	1604 1386	Capacitor - 100uF +-20% 50V	
148	1604 1390	Capacitor - 1000mF 50V	
150	1605 0141	Capacitor - 4700PF 50V	
151	1606 0658	Capacitor - 0.1uF 50V	
152	1606 1308	Capacitor - 27pF 50V	
153	1606 1326	Capacitor - 100pF 50v +-10%	
154	1606 1348	Capacitor - 0.022uF 50V	
155	1606 1451	Capacitor - 0.1uF 50V	
156	1606 1452	Capacitor - 0.01uF 50V	
157	1610 0035	Resistor - 100 Ohm 1/8W +-5%	
158	1610 0047	Resistor - 330 Ohm 1/8W +-5%	
159	1610 0053	Resistor - 1k Ohm 1/8W +-5%	
160	1610 0057	Resistor - 1.5k Ohm 1/8W +-5%	
161	1610 0065	Resistor - 3.3K Ohm 1/8W +-5%	
162	1610 0067	Resistor - 4.7k Ohm 1/8W +-5%	
163	1610 0071	Resistor - 10k Ohm +-5% 1/8W	
164	1610 0073	Resistor - 12K Ohm 1/8W +-5%	
165	1610 0079	Resistor - 22k Ohm 1/8W +-5%	
166	1610 0107	Resistor - 1M Ohm 1/8W +-5%	
167	1610 0286	Capacitor - 100pF 50V +-10%	
168	1611 4103	Resistor - 10k Ohm 1/4T +-5%	
169	1611 4121	Resistor - 120 Ohm 1/4T +-5%	
170	1611 4229	Resistor - 2.2 Ohm 1/4W +-5%	
171	1611 4272	Resistor - 2.7k Ohm 1/4T +-5%	
172	1611 4393	Resistor - 39k Ohm 1/4T +-5%	

Index No.	Part No.	Description	Q'ty per Assembly
173	1611 4472	Resistor - 4.7k Ohm +-5% 1/4W	
174	1611 4563	Resistor - 56k Ohm 1/4T +-5%	

LED

SYMBOL NO.	INDEX NO.
LED200	105
LED201	105
LED202	106

CONNECTOR

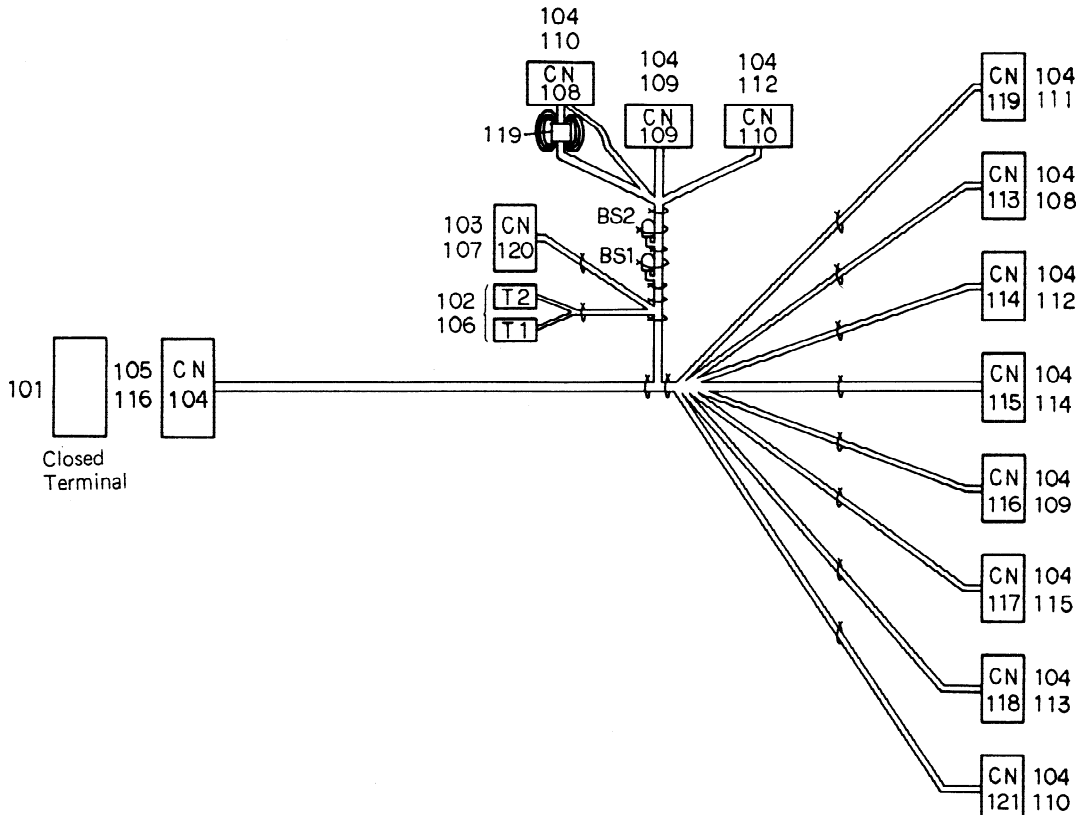
SYMBOL NO.	INDEX NO.
CN200	101
	103
CN201	102
	104

5. INDICATION BOARD (A318)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
*	A465 5260	Indication Board	1

Index No.	Part No.	Description	Q'ty per Assembly
101	1100 1306	Terminal	
102	1100 1328	Contact	
103	1102 1805	Connector - 4P	
104	1102 1967	Connector - 6P	
105	1403 0236	L.E.D. - MU02-520	
106	1403 0237	L.E.D. - MU20-220	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110
CN
108
104
109
CN
109
104
112
CN
110
119
103
107
CN
120
BS2
BS1
102
106
T2
T1
101
105
116
CN
104
Closed
Terminal
CN
119
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111
CN
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108
CN
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CN
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CN
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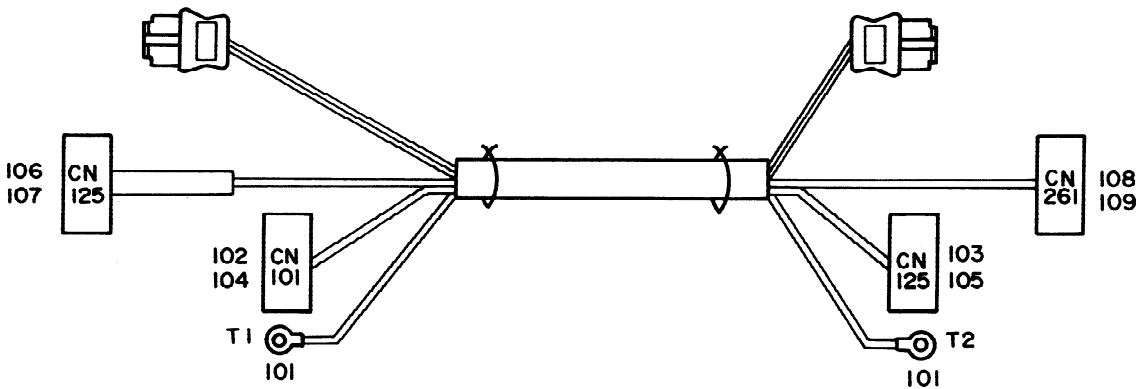
CN
121
104
110

6. MAIN HARNESS (A318)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
*	A318 5220	Main Harness	1

Index No.	Part No.	Description	Q'ty per Assembly
101	1100 0340	Closed Terminal	
102	1100 1169	Fastening Receptacle	
103	1100 1253	Pin - Mate-N-Lock	
104	1100 1327	Contact	
105	1100 1348	Pin Contact	
106	1102 1408	Connector - 1P	
107	1102 1756	Connector - 2P	
108	1102 1910	Connector - 2P	
109	1102 1911	Connector - 3P	
110	1102 1912	Connector - 4P	
111	1102 1914	Connector - 6P	
112	1102 1924	Connector - 2P	
113	1102 1925	Connector - 3P	
114	1102 1938	Connector - 2P	
115	1102 1939	Connector - 3P	
116	1103 0659	Connector - 34P	
119	1607 0116	Ferrite Core	


106
107
CN
125
102
104
CN
101
T1
101
CN
125
103
105
T2
101
CN
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108
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7. INTERFACE HARNESS (A318)

December 1, '90

Index No.	Part No.	Description	Q'ty per Assembly
*	A318 5205	Interface Harness	1

Index No.	Part No.	Description	Q'ty per Assembly
101	1100 0051	Connector	
102	1100 1190	Socket - Mate-N-Lock	
103	1100 1447	Socket - Mate-N-Lock	
104	1102 1374	Connector - 4P	
105	1102 1517	Connector - 4P	
106	1102 1089	Connector - 3P	
107	1100 1259	Socket - Mate-N-Lock	
108	1102 2025	Pin Housing - 3P	
109	1100 1330	Socket Contact	

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MC-Service

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0354 0060W	Philips Truss Head Screw - M4x6	5-115
0413 0082W	Tapping Screw - M3x8	3-102
0573 0030E	Hexagon Headless Set Screw - M3x3	5-113
0573 0060E	Hexagon Headless Set Screw - M3x6	5-114
0584 0103W	Hexgon With Flange Screw - M4x10	3-104
0632 0080G	Parallel Key - 2x8mm	5-112
0632 0080G	Parallel Key - 2x8mm	7-116
0632 0100G	Pin - 2x10mm	3-114
0632 0100G	Pin - 2x10mm	5-110
0632 0100G	Pin - 2x10mm	7-114
0632 0140G	Parallel Pin	5-111
0633 0120G	Parallel Pin - 3x12	7-115
0701 0040B	Flat Washer - M4	7-117
0701 0060B	Flat Washer - M6	3-112
0704 0040C	Toothed Washer - M4	7-113
0720 0025E	Retaining Ring - M2.5	5-109
0720 0025E	Retaining Ring - M2.5	7-112
0720 0030E	Retaining Ring - M3	3-111
0720 0030E	Retaining Ring - M3	5-123

Part No.	Description	Paper and Index No.
0720 0030E	Retaining Ring - M3	7-110
0720 0040E	Retaining Ring - M4	3-109
0720 0040E	Retaining Ring - M4	5-107
0720 0040E	Retaining Ring - M4	7-109
0720 0050E	Retaining Ring - M5	3-110
0720 0060E	Retaining Ring - M6	5-108
0720 0060E	Retaining Ring - M6	7-111
0741 3505	Ball Bearing - 5x10x4	5-119
0741 3505	Ball Bearing - 5x10x4	7-125
0741 3506	Ball Bearing - 6x12x4 mm	5-120
0741 3806	Ball Bearing - 6x13x5mm	3-118
0742 3905	Ball Bearing - 5x13x4mm	7-124
0742 3906	Ball Bearing - 6mm	3-117
0801 1185	Philips Truss Head Screw - M4x8	3-108
0801 1185	Philips Truss Head Screw - M4x8	7-101
0805 3383	Bushing - M5	5-121
0950 4006W	Philips Screw With Lock Washer - M4x6	5-122
0950 4006W	Philips Screw With Lock Washer - M4x6	7-126
0951 3004W	Philips Screw with Flat Washer - M3x4	5-106
0951 3006B	Philips Screw with Flat Washer - M3x6	3-106
0951 3006W	Philips Screw With Flat Washer - M3x6	7-105
0951 3010W	Philips Screw With Flat Washer - M3x10	5-102
0951 3010W	Philips Screw With Flat Washer - M3x10	7-108
0951 4005W	Philips Screw With Flat Washer - M4x5	3-103
0951 4005W	Philips Screw With Flat Washer - M4x5	5-124
0951 4006W	Philips Screw With Flat Washer - M4x6	3-105
0951 4006W	Philips Screw With Flat Washer - M4x6	5-103
0951 4006W	Philips Screw With Flat Washer - M4x6	7-100
1005 0843	Heat Sink - OSH2425SP	9-101
1100 0051	Connector	15-101
1100 0340	Closed Terminal	3-120
1100 0340	Closed Terminal	13-101
1100 1169	Fastening Receptacle	13-102
1100 1190	Socket - Mate-N-Lock	15-102
1100 1253	Pin - Mate-N-Lock	13-103

Part No.	Description	Paper and Index No.
1100 1259	Socket - Mate-N-Lock	15-107
1100 1306	Terminal	11-101
1100 1327	Contact	13-104
1100 1328	Contact	11-102
1100 1330	Socket Contact	15-109
1100 1348	Pin Contact	13-105
1100 1447	Socket - Mate-N-Lock	15-103
1101 0328	Connector Pin Contact	9-102
1102 0958	Connector - 2P	9-103
1102 1089	Connector - 3P	15-106
1102 1374	Connector - 4P	15-104
1102 1408	Connector - 1P	13-106
1102 1517	Connector - 4P	15-105
1102 1756	Connector - 2P	13-107
1102 1805	Connector - 4P	11-103
1102 1910	Connector - 2P	13-108
1102 1911	Connector - 3P	13-109
1102 1912	Connector - 4P	13-110
1102 1914	Connector - 6P	13-111
1102 1924	Connector - 2P	13-112
1102 1925	Connector - 3P	13-113
1102 1938	Connector - 2P	13-114
1102 1939	Connector - 3P	13-115
1102 1967	Connector - 6P	11-104
1102 2025	Pin Housing - 3P	15-108
1102 2966	Connector - HIF3BA-34PA	9-104
1103 0659	Connector - 34P	13-116
1103 0881	Connector - 4P	9-105
1103 1726	Connector - 4P	9-106
1103 1729	Connector - 7P	9-107
1103 1878	Connector - 2P	9-108
1104 0271	LSI Socket - 28P	9-110
1104 0333	Fuse Holder	9-111
1105 0008	Nylon Clip - 2N	5-117
1105 0009	Nylon Clip - 5N	5-118

Part No.	Description	Paper and Index No.
1105 0009	Nylon Clip - 5N	7-118
1105 0011	Nylon Clip - 8N	7-119
1105 0199	Clamp	5-116
1105 0199	Clamp	7-121
1106 0222	Cord Clamp	3-119
1106 0430	Bushing - 13mm	7-120
1107 0413	Fuse - 3A 125V	7-123
1107 0413	Fuse - 3A 125V	9-112
1204 0883	DIP Switch	9-113
1204 1319	Microswitch	7-122
1204 1385	Push Switch	9-114
1401 0282	Transistor - 2SB1020	9-115
1401 0329	Transistor Array - MP4503	9-116
1401 0832	Diode - DSA1A1	9-117
1403 0236	L.E.D. - MU02-520	11-105
1403 0237	L.E.D. - MU20-220	11-106
1403 0308	LED - TLR-102A	9-118
1403 0388	Photocoupler - ON3111	9-119
1407 0602	IC - TC4040BP	9-120
1407 0604	IC - TC4049BP	9-121
1407 1026	IC - SN74LS373N	9-122
1407 1334	IC - UPD7810G	9-123
1407 1348	IC - TD62304AP	9-124
1407 1535	IC - TD62308AP	9-125
1408 0076	IC - UPC14312H	9-126
1408 0408	IC - PST518A	9-127
1408 0521	IC - M51971L	9-128
1408 0578	IC - HA17339	9-129
1503 0070	Ceramic Oscillator - 10MHz	9-130
1600 0239	Resistor - 0.47 Ω ±5% 1W	9-131
1600 0544	Resistor - 1k Ω ±10% 1W	9-132
1600 0576	Resistor - 33 Ω ±10% 5W	9-133
1601 1732	Resistor - 390 Ω ±5% 1W	9-134
1601 7326	Resistor Array - 10k Ω	9-135
1601 8145	Variable Resistor - 5k Ω 0.5W	9-136

Part No.	Description	Paper and Index No.
1601 8147	Variable Resistor - 10k Ω 0.5W	9-137
1601 8148	Variable Resistor - 20k Ω 0.5W	9-138
1602 0953	Coil - 800uH 2.5A	9-139
1604 1358	Capacitor - 1000mF 10V	9-140
1604 1378	Capacitor - 1mF 50V	9-141
1604 1379	Capacitor - 2.2uF ±20% 50V	9-142
1604 1380	Capacitor - 3.3uF 50V	9-143
1604 1381	Capacitor - 4.7uF 50V	9-144
1604 1382	Capacitor - 10uF 50V	9-145
1604 1383	Capacitor - 22mF 50V	9-146
1604 1386	Capacitor - 100uF ±20% 50V	9-147
1604 1390	Capacitor - 1000mF 50V	9-148
1605 0141	Capacitor - 4700PF 50V	9-150
1606 0658	Capacitor - 0.1uF 50V	9-151
1606 1308	Capacitor - 27pF 50V	9-152
1606 1326	Capacitor - 100pF 50v ±10%	9-153
1606 1348	Capacitor - 0.022uF 50V	9-154
1606 1451	Capacitor - 0.1uF 50V	9-155
1606 1452	Capacitor - 0.01uF 50V	9-156
1607 0116	Ferrite Core	13-119
1610 0035	Resistor - 100 Ω 1/8W ±5%	9-157
1610 0047	Resistor - 330 Ω 1/8W ±5%	9-158
1610 0053	Resistor - 1k Ω 1/8W ±5%	9-159
1610 0057	Resistor - 1.5k Ω 1/8W ±5%	9-160
1610 0065	Resistor - 3.3K Ω 1/8W ±5%	9-161
1610 0067	Resistor - 4.7k Ω 1/8W ±5%	9-162
1610 0071	Resistor - 10k Ω ±5% 1/8W	9-163
1610 0073	Resistor - 12K Ω 1/8W ±5%	9-164
1610 0079	Resistor - 22k Ω 1/8W ±5%	9-165
1610 0107	Resistor - 1M Ω 1/8W ±5%	9-166
1610 0286	Capacitor - 100pF 50V ±10%	9-167
1611 4103	Resistor - 10k Ω 1/4T ±5%	9-168
1611 4121	Resistor - 120 Ω 1/4T ±5%	9-169
1611 4229	Resistor - 2.2 Ω 1/4W ±5%	9-170
1611 4272	Resistor - 2.7k Ω 1/4T ±5%	9-171
1611 4393	Resistor - 39k Ω 1/4T ±5%	9-172
1611 4472	Resistor - 4.7k Ω ±5% 1/4W	9-173
1611 4563	Resistor - 56k Ω 1/4T ±5%	9-174

FACTORY SETTING

SP MODE NUMBER	FACTORY SETTING DATA
41	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
42	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
43	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
44	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
47	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
48	128 129 130 131 132 133 134 135 136 137 138 139 140 [ ]

SERIAL No. _____

TEST POINTS

Copier Main Board

NUMBER	FUNCTION
TP101	GND
TP102	VCC (+5V)
TP103	ADS (Auto Image Density Sensor) Adjust the voltage to 2.5 ± 0.1 using VR101.)
TP104	GND
TP105	AVSS (GND)
TP106	GND
TP107	HT (23^{o}C 96kΩ)
TP108	BIN (Development Bias Feed Back)
TP109	GIN (Grid Voltage Feed Back)
TP110	PSE (ID sensor voltage) Adjust the voltage to 4.0 ± 0.2 using VR102.
TP111	EXPO (Exposure Lamp Voltage)
TP112	GND
JP103	Key Counter (Cut this jumper wire when installing the key counter on the machine.)

DF Main Board

NUMBER	FUNCTION
TP102	+5V
TP103	GND
TP104	Factory Use
TP105	+12V
TP106	+24V
TP107	Factory Use

DIP SWITCHES

Copier Main Board

DIP SWITCH	NORMAL	FUNCTION
101-1	OFF	Free Run
101-2	OFF	Forced Start (Ready temp. by-passed) **Factory Use**
101-3	OFF	Clear Counter and/or memory
101-4	OFF	Service Program modes access

DF Main Board

DIP SWITCH 101				FUNCTION
1	2	3	4	
ON	OFF	OFF	OFF	Normal
ON	OFF	OFF	ON	1 sided free run
OFF	ON	OFF	ON	2 sided free run
OFF	OFF	ON	ON	Solenoid test: Switch101 - solenoids ON Switch102 - solenoids OFF
ON	ON	OFF	ON	Motor test (lift switch must be ON.)
ON	ON	ON	ON	All indicators ON

Duplex Main Board

DIP SWITCH	FACTORY SETTING	FUNCTION
700-1		Jogger Position Adjustment (0.5mm per step) Refer to the Data Table.
700-2		
700-3		
700-4		
700-5	OFF	**Factory Use**
700-6	OFF	
700-7	OFF	
700-8	OFF	

Data Table

DIP SWITCH 700 (0:OFF, 1:ON)				ADJUSTMENT VALUE
1	2	3	4	
0	0	0	0	-3.5mm
1	0	0	0	-3.0mm
0	1	0	0	-2.5mm
1	1	0	0	-2.0mm
0	0	1	0	-1.5mm
1	0	1	0	-1.0mm
0	1	1	0	-0.5mm
1	1	1	0	±0
0	0	0	1	0.5mm
1	0	0	1	1.0mm
0	1	0	1	1.5mm
1	1	0	1	2.0mm
0	0	1	1	2.5mm
1	0	1	1	3.0mm
0	1	1	1	3.5mm
1	1	1	1	4.0mm

VARIABLE RESISTORS

Copier Main Board

NUMBER	FUNCTION
VR101	Adjusts ADS Voltage (2.5 ± 0.1)
VR102	Adjusts ID Sensor Voltage (4.0 ± 0.2)

Power Pack (CC/Grid/Bias)

NUMBER	FUNCTION
VRC	Adjusts Main Charge Current
VRG	Adjusts Standard Grid Voltage
VRB	Adjusts Standard Dev. Bias (Factory Use)

Power Pack (T&S)

NUMBER	FUNCTION
VRT	Adjusts Transfer Current
VRD	Adjusts Separation Current

AC Drive Board

NUMBER	FUNCTION
VR401	Factory Use

DF Main Board

NUMBER	FUNCTION
VR101	Factory Use
VR102	Original leading edge registration adjustment (One sided original mode)
VR103	Original leading edge registration adjustment (Two sided original mode)
VR106	Factory Use

SP MODE OVERVIEW

SP Mode		Data	When Performed
Movement Check			
5	Exposure Lamp OFF	-	EM
6	Jam Detection OFF	-	EM
8	Input Check (Refer to Sensor/Switch Data Check Table)		EM
9	Output Check (Refer to Electrical Component Check Table)		EM
Installation and/or Sales Demonstration			
10	Color Developer Initial Setting	-	Replace-ment
11	All Indicators ON	-	-
12	220V/240V Conversion	0: 220V 1: 240V	Installation
User Requests			
15	Auto Reset Time	0: 1 min. 1: 3 min. 2: None	-
16	Count Up/Down	0: Up 1: Down	-
17	Auto Feed Station Shift	0: Auto Shift 1: Manual	-
19	ADS Priority	0: ADS 1: Manual	-
20	APS Priority (When turning on the main switch) (**A054 copier only**)	0: APS 1: Manual	
21	APS Priority (When the original is set on the DF)	0: APS 1: Manual	-
22	SADF Shut-off Time	0: 5 sec. 1: 60 sec.	-
23	ADF Free Size	0: No 1: Yes	-
24	Factory Used		
25	Margin Adjustment in Duplex Mode	0: Yes 1: No	-
27	A3 (DLT) Double Counter	0: Normal 1: Double	-
28	Sort Priority	0: Manual 1: Auto Sort	-
29	Fusing Temperature Control	0: ON/OFF 1: Phase	-
Copy Quality Check and/or Adjustment			
30	Black Toner Supply Mode	0: Detect Mode 1: Fixed Mode	EM or PM
31	Black Toner Supply Ratio (Detect Mode)	0: 15% 1: 7% 2: 30% 3: 60%	EM or PM
32	Black Toner Supply Ratio (Fixed Mode)	0: 7.0% 1 3.5% 2:10.5% 3: 14.0%	EM or PM

SP Mode		Data	When Performed
33	ID Sensor Bias (Black)	0:-260V 1:-220V 2:-280V 3:-300V	EM or PM
34	ADS Level	0: Normal 1: Darker 2: Lighter	EM or PM
35	Black Toner ID Detection	0: 10 copies 1: 5 copies	
37	Black Bias Adjustment	0: Normal 1: Darkest 2: Darker 3: Lighter 4: Lightest	
41	Lead Edge Erase Margin Adjustment	0 – 15	EM
42	Registration Adjustment	0 – 15	
43	Vertical Magnification Adjustment	0 – 15	
44	Horizontal Magnification Adjustment	0 – 15	
47	Focus Adjustment	0 – 15	
48	Light Intensity Adjustment	100 – 150	EM and PM
49	Fusing Temperature Adjustment	175°C – 190°C	EM
51	Exposure Lamp Voltage Display	-	-
52	Fusing Temperature Display	-	-
54	Vsg Adjustment (VR102 on the main board)	4.0 ± 0.2 V	EM and PM
55	Vsg & Vsp Check	-	-
56	ADS Voltage Adjustment (VR101 on the main board)	2.5 ± 0.1 V	EM and PM
59	Bias Voltage Check	-	-
61	Drum Wear Compensation Setting	0: 1/10h 1: 1/20h	-
62	ID Sensor Grid Voltage Setting	**Factory Use (The data must be "7")**	-
63	Toner Supply Unit Initial Setting	-	Installation
64	Black Toner Density Level Display	0 – 4	-
65	Black Developer Initial Setting	-	Replace-ment
66	Drum Initial Setting	-	
67	Vr Correction Ratio	-	-
68	Vr Forced Detection	-	-
69	OPC Counter	-	-
	Options and Others		
70	Color Toner Supply Ratio (Fixed Mode)	0: 14% 1: 7% 2: 21% 3: 28%	EM or PM
71	Sorter Operation	0: No 1: Sorter (1) 2: Sorter (2)	Installation
73	Color Copy Counter	-	EM or PM

SP Mode		Data	When Performed
74	Color Toner ID Detection	0: 5 copies 1: 10 copies	EM
75	ID Sensor Bias (Color)	0: Normal 1: Lighter 2: Darker 3: Darkest	EM or PM
76	Sorter Bin Capacity	0: No Limit 1: Limit	EM
77	ADF Odd Number Originals (Duplex Mode)	0: ON 1: OFF	User Request
79	Color Bias Adjustment	0: Normal 1: Darkest 2: Darker 3: Lighter 4: Lightest	EM or PM
80	Red Toner Density Level Display	-	EM
81	Green Toner Density Level Display	-	
82	Blue Toner Density Level Display	-	
87	PM Interval Setting	0: No PM 1: 40K 2: 60K 3: 80K 4: 100K	-
88	PM Counter Display	-	-
89	PM Counter Reset	-	-
93	Maximum Copy Quantity	1 – 99	User Request
	Clear Mode		
98	Clear Counters	0: No 1: Yes	-
99	Clear All Memory	0: No 1: Yes	-
	Copy and Original Counters		
100	First Station Copies	-	EM or PM
101	1st Paper Tray Copies	-	
102	2nd Paper Tray Copies (**A054 copier only**)		
105	Duplex Copies	-	
106	DF Originals	-	
	Service Call Counters		
120	Service Calls (Total)	-	EM
121	Optics Section Service Calls	-	
122	Exposure Lamp Service Calls	-	
123	Not Used		
124	Fusing Section Service Calls	-	EM
125	Service Calls for Interface Communication	-	
	Misfeed Counters		
130	Misfeeds (Total)	-	EM
131	Number of Misfeeds by Location 1: Paper Feed 2: Exit 3: Sorter 4: DF 5: Duplex		

SERVICE CALL AND USER CODE TABLE

SERVICE CALL CODE

E-CODE	CONTENTS	SP Mode No. (SC Counter)
11	**Exposure Lamp Error** The feed back signal beomes higher than 4.2 volts (r.m.s) for 1.0 second when the exposure lamp is on, or it becomes higher than 1.0 volt (r.m.s) for 1.0 second when the exposure lamp is off.	SP Mode #122 (Exposure Lamp)
12	**Exposure Lamp Error** The feed back signal falls below 0.5 volt (r.m.s) for 1.0 second when the exposure lamp is on, or the exposure lamp stays on for longer than 10 seconds.	
13	**Zero Cross Signal Error** The CPU does not receive the zero cross signal within 0.56 second.	–
21	**Scanner Home Position Error** The scanner home position sensor remains off (LOW) 8 seconds after the main switch is turned on.	SP Mode #121 (Optics)
22	**Scanner Home Position Error** The scanner home position sensor still on (HIGH) 1.0 second after the scanner starts.	
28	**Lens Home Position Error** The lens home position sensor remains off (LOW) 3.5 seconds after the lens move to the home position.	
29	**Lens Home Position Error** The lens home position sensor is still on (HIGH) 3.5 seconds after the lens leaves the home position.	
2A	**4th/5th Mirror Home Position Error** The 4th/5th mirror home position sensor is still on (HIGH) 2.5 seconds after the 4th/5th mirror assembly moves to the home position.	
2B	**4th/5th Mirror Home Position Error** The 4th/5th mirror home position sensor is still off (LOW) 2.5 seconds after the 4th/5th mirror assembly leaves the home position.	
52	**Fusing Warm-up Error** The temperature detected by the thermistor does not reach 175 ^{o}C within 100 seconds after the main switch is turned on.	SP Mode #124 (Fusing Section) **Refer to NOTE b)**
53	**Fusing Overheat** The temperature detected by the thermistor becomes higher than 240 ^{o}C.	
55	**Fusing Thermistor Open** The temperature detected by the thermistor does not reach 2 ^{o}C within 30 seconds after the main switch is turned on.	

E-CODE	CONTENTS	SP Mode No. (SC Counter)
70	**Toner Overflow Sensor ON** When the toner overflow sensor is on, "E70" blinks in the magnification indicator. Up to 250 copies additional can be made. After 250 copies are made, "E70" lights and copies cannot be made.	–
80	**Duplex and Copier Main Board Communication Error** The copier main board does not receive any signal from the duplex main board.	SP Mode #125 (Interface Comunication)
81	**Interface Board Error** The interface board is not connected when the duplex unit is installed.	
82	**Jogger Home Position Error** The output of the jogger home position sensor remains LOW as the duplex main board is driving the jogger fences outward.	
83	**Jogger Home Position Error** The output of the jogger home position sensor remains HIGH as the duplex main board is driving the jogger fences inward.	

NOTE: a) E-codes (E1 to E8) are displayed in the copy counter. To display the two digits, press the Enter key.

Example:
When the machine detects the E11 condition, E1 is displayed in the copy countrer. Hold down the Enter key, and "11" is displayed in the copy counter.

b) When the service call (E5) conditions occur, for safety reason they cannot be cleared by turning off/on the main switch. The following procedure must be performed to clear these service call conditions:

1. Turn on the main switch.
2. Turn DIP switch 101-1 on and off.
3. Turn the main switch off and on.

USER CODE

U-CODE	CONTENTS
1	Right Cover Open
2	Key Counter Not Set
3	Development Unit Not Set
4	Sorter Open
5	Cassette Lift Sensor Not ON (Cassette is not properly set.)